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FARM WATER SUPPLY AT SAMSONVALE.

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How Four Dairy Farms Boosted Profits

By L. A. WILLIS, Cattle Husbandry Branch.

Dairy farmers often ask, Is herd recording worthwhile? A survey of recorded herds on the south coast of Queensland shows that many farmers have found it so. The improvement shown in the production of their herds since they commenced recording speaks for itself.

The methods used by the men running four of these successful dairy farms (members of the Merrimac-Mudgeeraba Herd Recording Group) are described in this article. Their example may well be followed by many dairymen throughout the State.

Size Down, Production Up.

Messrs. J. Rosin and A. Herse were in a bakery business, but six years ago gave their attention to the dairy industry and purchased a farm in the Numinbah Valley.

A record of their herd production over five years shows:

Year.	No. of Cows.	Average Production per Cow.			Lactation Length (days).	Total Production.	
		Milk lb.	Test %.	Butterfat lb.		Milk galls.	Butterfat lb.
52/53 ..	48	2,406 (−770)	4·4	105 (−25)	191	..	..
53/54 ..	76	2,282	4·2	95 (−17)	174	17,328	7,220
54/55 ..	48	3,584	4·3	150	206	..	..
55/56 ..	51	4,381	4·7	204	251	..	..
56/57 ..	37	4,654 (+1,244)	4·6	213 (+73)	278	17,205	7,881

Figures in brackets with — sign indicate amount below group average, with + sign the amount above group average.

Since 1953-54 the herd size has been reduced from 76 to 37, but gross production has increased by 661 lb. butterfat, worth £132.

Their farm is largely frost-free, thus pastures suffer little frost damage.

Hilly, rocky country prevents the use of implements for pasture renovation. Kikuyu and paspalum with some clover form the main pasture species. A good response was obtained with some top-dressing of pastures with dolomite and superphosphate.

These farmers commenced with a very mixed herd. Heavy culling and use of a production-backed bull has vastly improved this herd. Heifers reared on the farm are kept growing at a good rate. A bull paddock is used to control breeding.

Great importance is placed on the careful handling of their cows. Young calves are dehorned with a hot iron.

Each cow is fed 1-1½ lb. concentrate per day during milking and has free access to good water.

Plate 1.

"Brookland Jubilee Star," (background) with One of his Daughters out of an Advance Register Cow. This bull is being used by Messrs. J. Rosin and A. Herse to improve their herd production.

The partners give considerable attention to disease control and have overcome a severe tick infestation. Strain 19 and Blackleg vaccinations and drenching of calves for worm control are routine practices.

Messrs. Rosin and Herse attribute their feat of doubling production per cow in four years to these main factors:—

(1) Reduced stocking rate, resulting in more feed per head.

(2) Disease and parasite control.

(3) Controlled calving.

(4) Heavy culling of low producers.

(5) Contented animals.

(6) Continuous herd recording.

Breeding and Feeding.

Mr. N. Holden has good reason to be proud of his Guernsey herd which he runs on his 100-acre farm in the Numinbah Valley. His 19 Guernsey cows averaged 515 gal. milk and 230 lb. butterfat during the 1956-57 season.

His progress in herd production over three years is as follows:—

Year.	No. of Cows.	Average Production per Cow.			Lactation Length (days).
		Milk lb.	Test %.	Butterfat lb.	
54/55	12	4,549	4·3	200	255 (+46)
55/56	20	4,834	4·5	216	263
56/57	19	5,148 (+1,738)	4·5	230 (+90)	289 (+43)

Kikuyu, paspalum and mat grass, with some clover, form the main pasture species on this farm. The hilly countryside restricts the area available for cultivation. Six acres of maize provides silage, while two acres are used for growing a mixture of oats, peas and tares for winter feed. One and a half acres of phalaris, rye grass and clover are used for grazing.

Purebred Guernesy bulls have been used in the herd for the past 20 years and have been purchased from the one stud for the past 14 years. Breeding is controlled. Heifers reared on the farm are dehorned as calves with a chemical preparation. Stock have free access to good creek water from all paddocks.

Maize silage is fed from May to August at approximately 40 lb. per cow daily. A 17 per cent. protein concentrate is fed at 2-3 lb. per day, increasing to 6 lb. when pastures are dry and cows at top production.

Mr. Holden sums up his herd management as good breeding, good feeding and kind treatment of his animals.

Well Above Average.

Mr. L. Firth, Mudgeeraba, has in 10 years practically doubled the carrying capacity of his farm while maintaining production higher than the group average. In 1956-57 production was 102 gallons of milk per cow above average.

His progress in herd production over five years is:—

Year.	No. of Cows.	Average Production per Cow.			Lactation Length (days).
		Milk lb.	Test %.	Butterfat lb.	
52/53	77	3,997 (+821)	4·1	162 (+32)	212
53/54	118	3,209 (+427)	3·9	124 (+12)	193
54/55	102	3,850	4·0	152 (+4)	234
55/56	132	3,919 (+233)	3·9	155	230
56/57	109	4,427 (+1,017)	3·9	172 (+32)	238

Plate 2.

Messrs. J. Rosin and A. Herse with a Group of 18-21 Months Old Dehorned Jersey Heifers. Three daughters and one grand-daughter of "Brookland Jubilee Star" are in this group. The bull is in the background.

Plate 3.

Mr. N. Holden With His Dehorned Guernsey Cows. They averaged 515 gal. milk and 230 lb. butterfat during the 1956-57 season.

The farm is subject to flooding and this prevents cultivation. Mr. Firth's main endeavours have been directed towards improvement of the existing pastures. Lantana and weeds have been largely eradicated. Mat grass is being suppressed, with improvement of kikuyu, paspalum and clover by ripping and fertilizing. Pasture growth on the ridges has been improved as a result of moisture held by pasture furrows. Irrigated winter pastures are grown in some years.

Purebred A.I.S. bulls, purchased on production records, sire the herd replacements being reared on this farm. Mr. Firth intends dehorning the herd this year as he believes it will result in more contented cows.

Lucerne hay is bought when prices are cheap, and stored for winter feeding. It is supplemented by concentrates.

Mr. Firth attributes his improved production per acre and per cow to four main factors:—

(1) Provision of more and better feed through pasture improvement.

(2) Heavy culling of low producers.

(3) Continuous herd recording.

(4) Feeding hay and concentrates to supplement winter pastures.

Recording as Guide.

Mr. W. Kamholtz and his sharefarmer, Mr. J. Wright, of Nerang, commenced herd recording in 1952. In 1953-54 there were 73 cows in the herd. Since then stock numbers have been reduced and production per cow has increased to 85 gal. milk and 33 lb.

butterfat above the group average. Here are figures showing Mr. Kamholtz's herd production over five years:—

This mixed A.I.S. x Guernsey herd is being graded up to the Guernsey breed by using Guernsey bulls purchased on production records. A bull

Year.	No. of Cows.	Average Production per Cow.			Lactation Length (days).
		Milk lb.	Test %.	Butterfat lb.	
52/53	29	3,931 (+755)	4·0	157 (+27)	214 (+5)
53/54	73	2,898	3·9	113	194
54/55	41	4,585	3·9	180	266
55/56	51	5,175 (+1,489)	4·1	212 (+57)	272 (+27)
56/57	58	4,258 (+848)	4·1	173 (+33)	259 (+13)

Pastures are renovated by ripping with a chisel plough, thus reducing the proportion of mat grass in the paspalum, kikuyu, clover sward. Oats for winter grazing is strip-grazed. An electric fence is used for the purpose.

paddock is used and the matings controlled.

Extensive culling has weeded out low producers. Herd replacements, reared on the farm, are dehorned as calves by chemical means or at 12-18 months with guillotine dehorners.

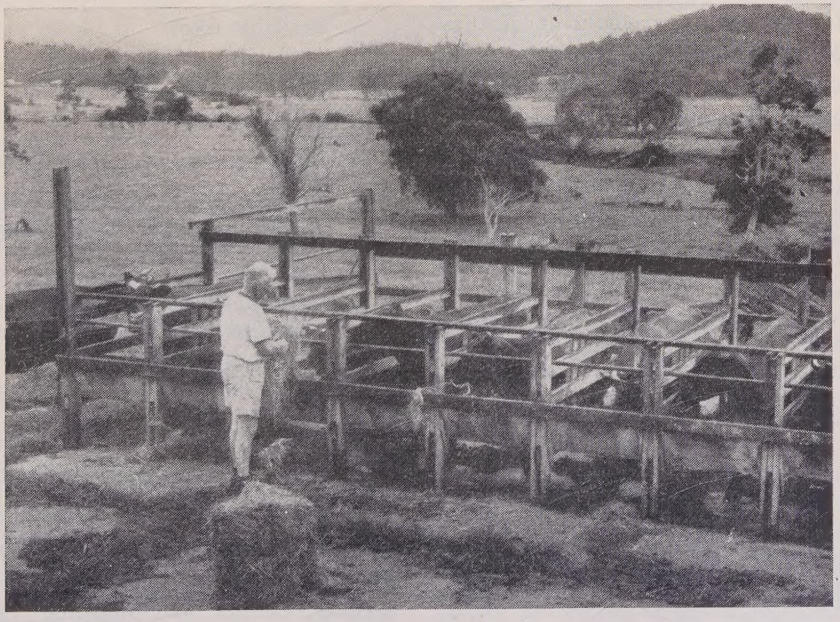


Plate 4.

Mr. L. Firth Feeding Lucerne Hay to His A.I.S. Cows.

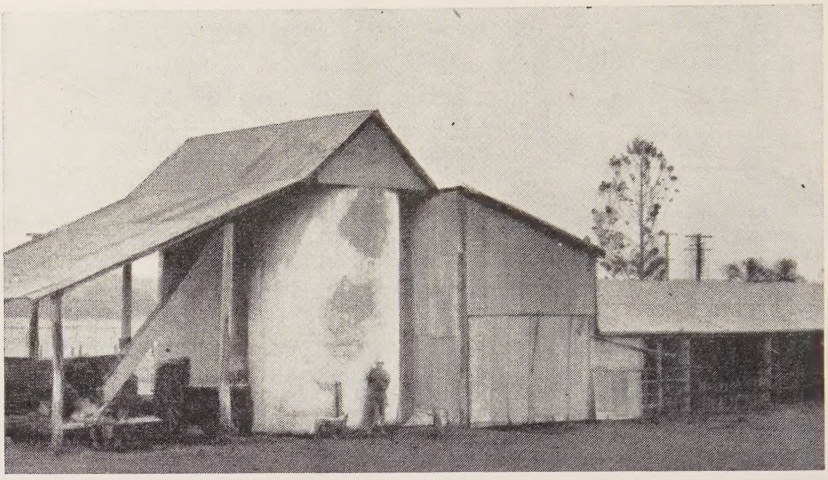


Plate 5.

Mr. J. Wright Beside Tower Silos Built Adjacent to the Feeding Stalls.

Maize silage is fed from April to August at 70 lb. per cow daily in April and tapering off to 20 lb. per day in August. Concentrates (three parts by weight grain to one part meat meal) are fed at 4 lb. per cow daily for the first three months of lactation, 2 lb. daily for the next two months and 1–1½ lb. daily for the remainder of the lactation.

Messrs. Kamholtz and Wright consider their improved production to be due to these main factors:

(1) Feeding of silage and concentrates.

(2) Improvement of pastures to provide more feed.

(3) Culling of low producers.

(4) Continuous herd recording.

Five Main Factors.

Let us look at the main points in dairy farm management as practised by these men:

(1) *Feeding.*—Plenty of feed for the herds as shown by increased production and longer lactations.

Pastures kept free of weeds and logs; renovated and fertilized.

Stocking rate adjusted to available feed.

Cheap roughage, hay and silage form bulk of rations to supplement pastures.

(2) Heavy *culling* of low producers.

(3) *Disease Control.*—Tick, infertility, Blackleg and worm control.

(4) *Controlled Calving.*—Production arranged at most profitable time of year to suit their particular conditions.

(5) *Dehorning.*

These men are all using production-backed bulls to improve their herds. Continuous herd recording has supplied them with information for their feeding, culling and breeding programmes and will continue to guide their future herd management.

Rhodes Grass-Lucerne Pasture at Kairi

By G. W. KYNEUR, Agronomist, and P. G. TOW, Assistant Agronomist.

(*Continued from page 406 of the July issue.*)

The grazing period, carrying capacity, yield and food value of the pasture are all important and the production of milk or butter per acre should be the yardstick of measurement of the value of the pasture.

For an average Rhodes grass-lucerne pasture the graph shown in Plate 8 gives a general idea of the growth cycle and grazing period.

WHY RHODES GRASS PREFERRED.

In view of the rather coarse nature of the Rhodes grass and the short season of palatable, leafy growth, the query is sometimes raised as to whether it is worth a place in a pasture intended for dairy cows. The answer is definitely in the affirmative. The grass has many qualities which are superior to those in other grasses at present available. Its superior palatability during early summer, its drought- and frost-resistance, ease of establishment and rapid, early growth, its high productivity and its proven ability to renovate the soil structure are all qualities which are not so well developed in other species. As Kairi Station is located in the drier section of the Tableland, Rhodes grass fits very well into the rotational farming scheme, and it is easily eradicated from paddocks required for cultivation.

OTHER PASTURE SPECIES.

There are several other species of summer-growing grasses which make good pastures where conditions are unusual, as, for example, where soils are highly fertile or when they are poor or badly eroded, or where the situation is low-lying and moist. Some examples of these follow:

Green Panic.

At the moment the most widespread of these alternative species would be green panic (*Panicum maximum* var *trichoglume*). This species seems to be more palatable than Rhodes grass, it matures later in the season and has an overall higher protein content. On the other hand, it is more susceptible to frost and drought; it requires a fairly high level of soil fertility and is seriously affected by heavy continuous grazing. The seed costs two or three times more than Rhodes and it is normally lower in percentage germination.

Best results from green panic can be expected if it is planted on a deeply cultivated, highly fertile soil at about 7 lb. per acre and covered to a depth of about ½ in. The seed has no long awns and will run through the grass seed box, which is a big point in its favour. If the soil structure is satisfactory and fertility high, the grass will produce large amounts (up to 6 tons/acre) of leafy, succulent fodder within a few months.

It is interesting to note the relative growth of green panic and Rhodes grass planted side by side in plots in a large paddock. (See Plate 10.) The graph illustrates the early rapid growth of Rhodes grass—which is a desirable characteristic. Towards the end of the first year, the growth rates

Available Fodder in a Rhodes Grass–Lucerne Pasture During First Year of Grazing Planted January 1956

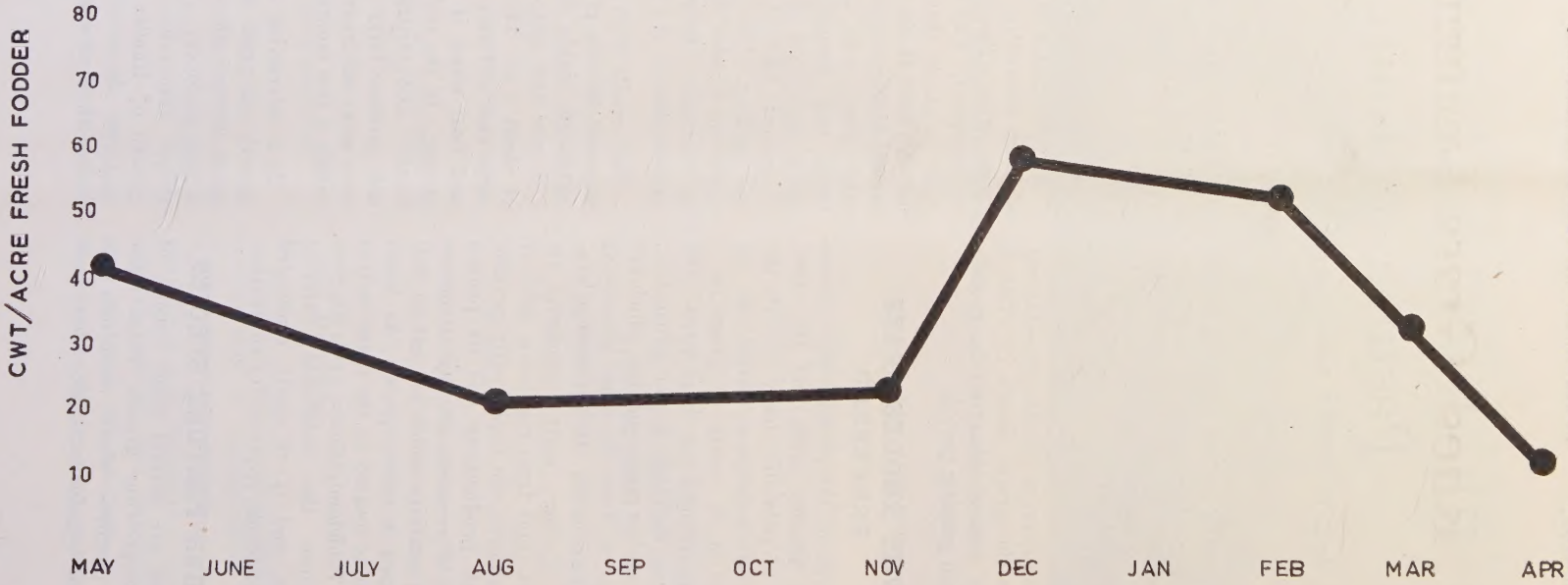


Plate 8.

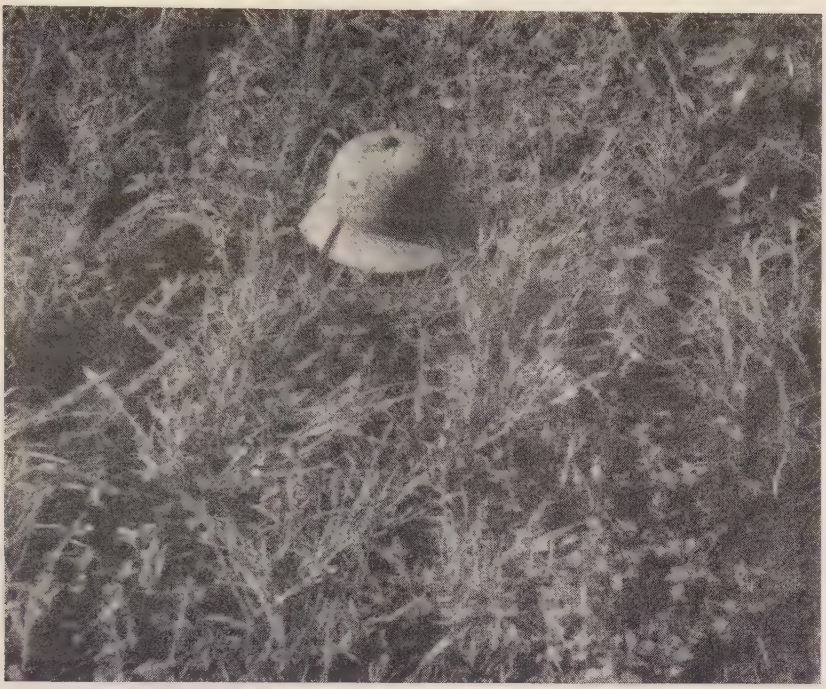


Plate 9.

Vigorous Growth of a Newly Established Green Panic Pasture.

of each grass are approximately similar. At the end of the following wet season—March—green panic produced more feed per acre than the Rhodes.

The high nitrogen requirement of the green panic makes it very necessary to incorporate a perennial legume with the grass or to apply a heavy annual dressing of nitrogenous fertilizer. If neither of these measures is adopted the grass becomes yellow and stunted and growth is very poor, even during the flush season.

Glycine.

A legume provides the key to maintaining a good supply of available soil nitrogen and the most suitable legume for association with green panic is glycine (*Glycine javanica*). It is a tropical summer grower with a creeping habit and does best when it has some support.

The plant is readily established from seed, which it produces prolifically. Its early growth is usually slow, but after about 18 months, it may comprise 15–20 per cent. of the pasture material. With good grazing management this balance can be maintained and the grass will benefit from the nitrogen supplied by the associated legume.

Grass without legume.

When green panic-glycine areas are compared with pure green panic areas, the difference is very striking. In the mixed pasture, the grass is greener and growth heavier and the cattle concentrate on the mixture, whereas, on the pure grass, grazing is very light. The cattle do not show any marked preference for the glycine as they do for lucerne, but they keep it grazed back sufficiently to prevent it overgrowing the grass.

Production of Available Fodder During First Year of Grazing of a Rhodes Grass-Lucerne and a Green Panic-Lucerne Pasture Planted January 1956

Plate 10.

Plate 11.

Glycine javanica is a Valuable Legume for Combination with Grass Pastures of the Tableland.

Plate 12.

Common Guinea Grass on the Right, and Elephant Grass on the Left, are Very Useful High-Producing Pasture Species.

Plate 13.

Kikuyu Grass Can Be Successfully Established from Runners in the Wet Season.

Guinea grass.

Guinea grass (*Panicum maximum* var *typica*), often called "common guinea" is similar to green panic in its general growth and requirements. However, it will tolerate less fertile soil for a longer period than will green panic and its drought- and frost-resistance are better, but it has the disadvantage of producing coarse, tall growth during the wet season unless heavily grazed or mown. It also forms an excellent association with glycine and the pair make a good combination for use on hillsides or contour banks and waterways.

Elephant grass.

Elephant grass (*Pennisetum purpureum*) can usually be relied upon to provide a heavy growth of good, leafy fodder during hot, spring weather provided it is grown in rows and kept deeply cultivated. It will produce long, stalky growth during the wet season unless it is heavily grazed or mown, and if allowed to reach this stage, the stems soon harden and the grass becomes quite useless for dairy cows.

It produces good "night paddock" pastures and responds well to cultivation and fertilization.

Kikuyu.

Kikuyu (*Pennisetum clandestinum*) is a very valuable pasture species although difficulty is sometimes experienced in establishing it. The grass does not set seed and all propagation is by means of runners.

The best time to plant kikuyu is early in the wet season. A convenient method is to plough a furrow, line the bottom with old tough runners, then plough another furrow. This fills in the first one and opens another ready for planting. On old land, an application of 2–4 cwt. of sulphate of

Plate 14.

Para Grass, in the Foreground, Provides Good Summer Pasture in Low-Lying or Damp Situations.

Plate 15.

Elephant Grass Gives Profuse Summer Growth and Long Season Grazing if Correctly Managed.

ammonia at planting time will stimulate quick, early growth.

The grass would not be ready for grazing under 5–6 months, but from then on, a constant monthly production of green, leafy growth is usual.

The grass is very frost- and drought-resistant and does not appear to pass through a phase of unpalatability as do the other tropical species.

Para grass.

Para grass (*Brachiaria mutica*) is a vigorous summer grower and is excellent for establishment in low-lying damp situations and along creek banks. It is highly palatable but very susceptible to frost and takes a long while to recover from frost damage.

It is established from cuttings in a manner similar to kikuyu.

Molasses grass.

Molasses grass (*Melinis minutiflora*) is a very palatable summer and autumn grower but also very susceptible to frost. It will tolerate a lower level of soil fertility than most other species but its production of fodder during winter and spring is poor under local conditions.

Its very light, hairy seed presents problems at planting time.

Paspalum.

Paspalum (*Paspalum dilatatum*) has a use on soil containing rocky outcrops and under these conditions produces mediocre growth. However, it is more drought-resistant than the tropical species and during the wet season it resembles kikuyu in that it produces good, leafy growth and less seed heads and stalks than do the tropical species.

Warm Pigs; More Profits

Many pig farmers do not realise that profits can be reduced seriously in winter months unless preparations for cold weather are made in the piggery.

Pigs appreciate wintertime comfort as much as we do, and show their appreciation of good conditions by staying healthy and growing rapidly.

When cold winds blow, or winter rains make outside conditions miserable, pigs will seek a warm spot for shelter. If they cannot make themselves comfortable, resistance to disease is lowered and they need more food to keep them warm. Cold, miserable pigs do not make as much growth from a given amount of feed as do contented pigs.

To keep your profit margin as high as possible give your pigs a warm shed, and keep it clean and dry. Add bedding if the floor is cold, and cover all cracks and openings which let in cold wind or rain. Sows with young litters, as well as newly weaned pigs, should receive special attention along these lines.

If you add a little extra feed to the daily ration in cold weather you make sure the pigs grow rapidly, thus saving feed in getting them to market. However, take care that waste does not occur through overfeeding.—*T. ABELL, Senior Adviser, Pig and Poultry Branch.*

Barn Hay Drying

By C. G. WRAGGE, Agricultural Engineer.

Farmers interested in barn hay drying will get valuable information from this article. Details of fans and heating will follow in September and October.

While great interest is now being taken in silage-making, hay still forms the major part of conserved fodder. There have been many advances in the technique of haymaking, such as the adoption of the pick-up baler. Under suitable weather conditions and with modern machinery, hay of high protein content can be produced from protein-rich crops. The emphasis here must be placed on suitable weather conditions for it is upon this factor that the fodder value of the hay depends.

Crop drying is an attempt to eliminate the weather effect, and under conditions of good crop and machine management, drying can produce a high-protein product. Its great disadvantage is high operational costs, due primarily to the need for evaporating large tonnages of water and the cost of fuel involved.

In the search for a compromise between entire dependence on the weather on the one hand and the expense of drying by heat on the other,

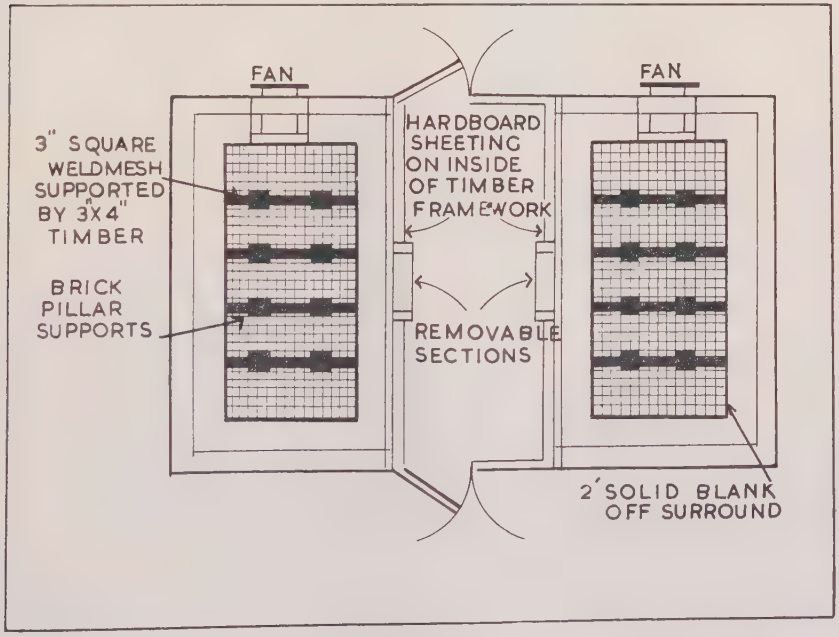


Plate 1.

Plan of a typical two-bay hayshed conversion with a central "drive-in" for loading either side. This plan is suitable for barn hay drying on the storage/drying system. There is a raised loading platform (similar to that shown in Plates 2 and 4) in each bay.

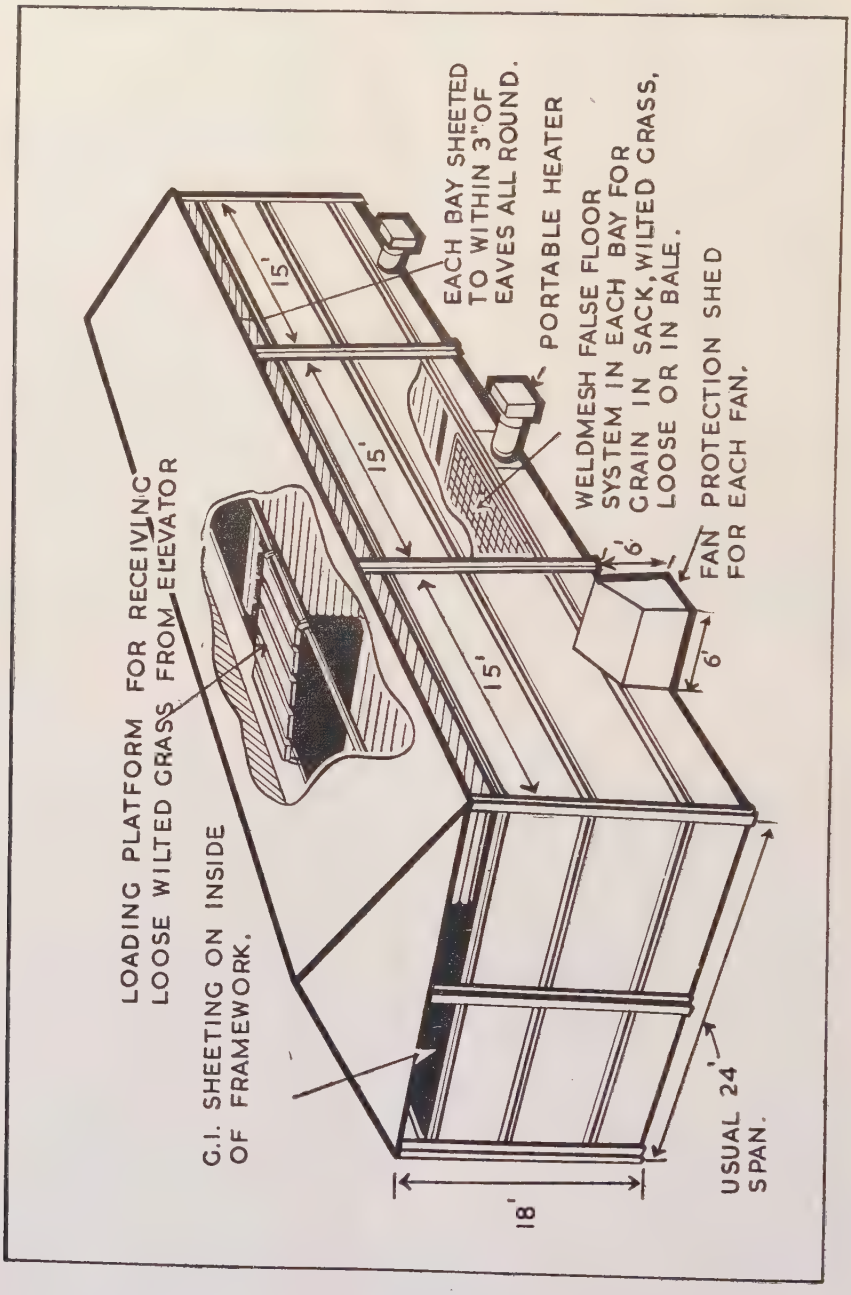

LOADING PLATFORM FOR RECEIVING LOOSE WILTED GRASS FROM ELEVATOR
G.I. SHEETING ON INSIDE OF FRAMEWORK.
EACH BAY SHEETED TO WITHIN 3" OF EAVES ALL ROUND.
PORTABLE HEATER
WELDMESH FALSE FLOOR SYSTEM IN EACH BAY FOR GRAIN IN SACK, WILTED GRASS, LOOSE OR IN BALE.
FAN PROTECTION SHED FOR EACH FAN.
15'
15'
15'
6'
6'
18'
USUAL 24' SPAN.

Plate 2.

A three-bay batch hay drier with a portable electric heater which can be moved to each fan as required. The centre section of each vertical bay partition is removable to floor level to facilitate the unloading of dried material. The weldmesh false floor used is suitable for bagged grain and wilted grass, loose or baled.

the system of barn hay drying, or "mow-drying" as it is termed in America, has been evolved.

Overseas Practices.

The method employed in barn hay drying involves wilting in the field from the initial moisture content at the time of mowing to about 50 per cent. or less. The effect of this "wilting" is important. The following figures will serve to emphasise this:

Grass with an initial moisture content of 80 per cent., if dried to 10 per cent., will require an evaporation of 3½ cwt. of water to produce 1 cwt. of dried grass.

At 70 per cent. initial moisture content, 2 cwt. of moisture must be evaporated, while at 60 per cent. initial moisture content, 1½ cwt. of water must be evaporated.

Thus a small difference in initial moisture content (at high levels) has an appreciable effect on the amount of water to be evaporated and on the final cost per ton of the finished product.

Wilting of the cut crop is facilitated by tedding the cut swath. This operation should be carried out immediately after mowing and repeated at intervals, if necessary, to hasten the reduction in the moisture content to 50 per cent. or less. Loading and carting should be carried out as soon as possible. Some loss of carotene during the wilting process is inevitable; this loss does not become serious until the crop is wilted to below 30 per cent. moisture content. The wilted crop is laid over the false floor of the barn or shed to a height of about 8 ft. Unheated air is then blown through continuously until the moisture content of the hay is reduced to 20 per cent. or less. At this moisture content, the height of the first load will have settled to approximately 5 ft., and a further layer is added to

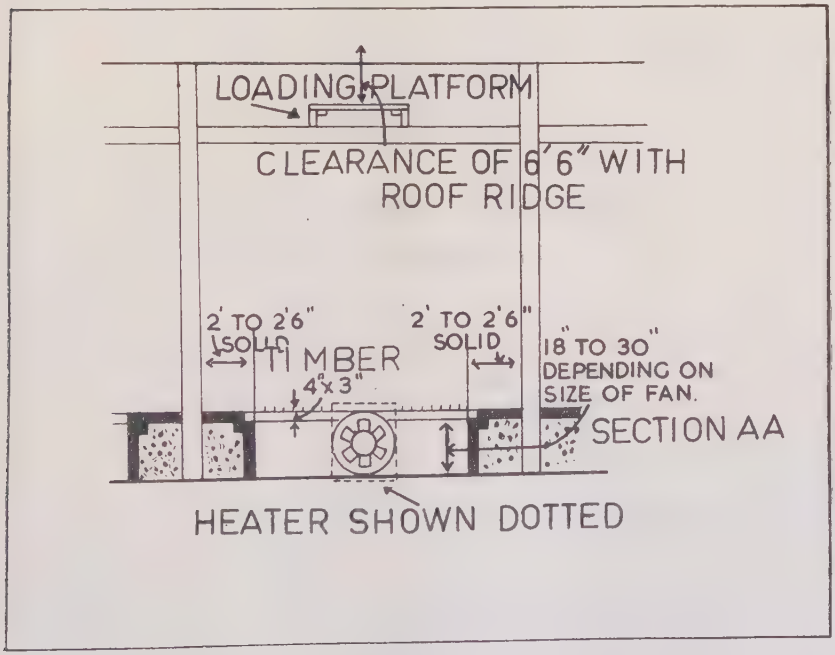


Plate 3.

A sectional end view of a barn hay drier showing details of the false floor and loading platform.

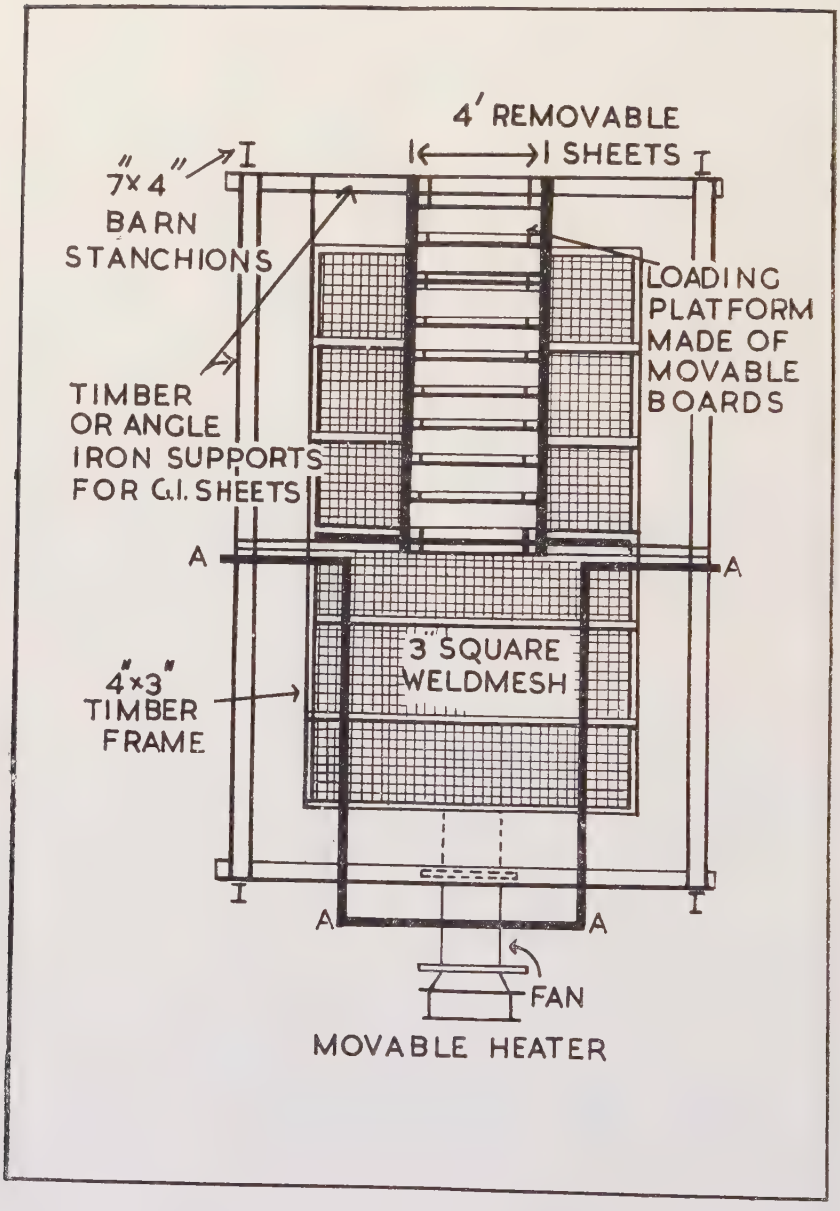


Plate 4.

Plan of details of barn hay drier showing floor plan and overhead loading platform.

a height of 8 ft. above the previous layer. This procedure is repeated until the barn is loaded to capacity. The hay is then unloaded from the drier and stacked elsewhere, unless the drier is large enough to hold the whole crop.

If the hay is to be baled, there is no point in drying below 15 per cent. as it has been found that uniform baling is best obtained at 15 per cent. moisture content. If the hay is stored before baling, under humid conditions the moisture content may rise above 15 per cent.; in this case it should be brought back to 15 per cent. before baling.

Construction of Drier.

The drier is of simple construction, and the conversion of existing barns or haysheds is relatively easy. To convert such buildings for unheated air drying a simple system of false flooring constructed of 2 in. or 3 in. weldmesh not less than 3G., or 2 in. x 1 in. wood slats on 4 in. x 3 in. bearers is supported by a low brick or concrete wall surround, and brick or concrete piers (Plates 1, 3 and 4). Air is forced under this false floor by means of a fan mounted in or outside one of the walls. The size of the fan will determine the height of the false floor from ground level. The ground surface should be as smooth as possible so as to reduce frictional loss.

The hay must be enclosed on all four sides by flush, reasonably air-tight walls, to a height of 10 ft. or more, and to within 3 in. of the eaves all round. This 3 in. space at the eaves is left to provide the necessary ventilation (Plate 2). The conversion of an existing building inevitably means the erection of a wall on the open side. This wall can be of plastered breeze block, of hardboard, or of corrugated sheeting. Temporary removable panels can be made to fill up open doorways to facilitate unloading. Undue consolidation of the wet hay by trampling must be avoided. If necessary an overhead loading platform must be used; the positioning of this platform depends on the size and type of drier. The headroom required will depend on the drying procedure adopted, that is, batch drying or storage drying.

If it is desired to use heated air to accelerate drying or increase throughput, an electric or fuel oil burner heating unit will have to be installed. If electric power is available it permits the use of a portable heater unit which is merely bolted on to the fan housing. In a multi-bay installation (Plate 2) it can be used as a "communal" heater and moved from fan to fan, so economising in capital cost of wiring, switchgear and kilowatt loading.

[TO BE CONTINUED.]

FOR ONION GROWERS.

Current regulations require onions to be marketed in two grades:

A. **No. 1 grade** (to include first quality large and first quality table), as set out in *Queensland Agricultural Journal,* May 1, 1958; and *B*. **Picklers.**

☆ ☆ ☆

● What about a patch of fodder cane? Prepare land now.

☆ ☆ ☆

Silage Costs and Feeding

By Officers of the Agriculture Branch.

IT is very difficult to cost farm crops because there are a number of factors which vary greatly from season to season on any one farm. In addition these same factors may vary considerably between farms.

Climate, efficiency of land preparation and type of crop all influence yield per acre and to a great extent cost per ton.

In addition, the method of making the ensilage varies the labour costs and operating charges as well as the overhead charges of interest and depreciation.

As the recovery of usable silage varies with different silage systems, this too must be taken into account. In conventional tower silos, it is reasonable to anticipate a recovery of 85 per cent. of the crop weight that was put into the silo. With good trench silage the recovery would be about 75 per cent., while with stack silage only about 65 per cent. recovery would be expected.

Mechanisation does not necessarily result in lower costs of production. It does assist in handling a crop more quickly. High yields per acre are of greatest importance in reducing costs of handling.

Estimating Quantities to Conserve.

The amounts of silage to be fed daily to stock will vary according to a number of factors, the principal ones being, quality of the silage, availability of other feed, class of stock being fed and whether they are being fed for maintenance or production. As a general guide for estimating amounts to be conserved for a given number of stock, an amount of equivalent to 3–4 lb. daily per 100 lb. liveweight of the animals being fed can be used, that is, for maintenance of a cow of 1000 lb. liveweight allow 30–40 lb. silage.

The following figures are a guide to the requirements for various classes of stock:

Dairy cows in milk	30–70 lb./day.
Dry dairy cows	20–40 lb./day.
Dairy heifers	15–35 lb./day.
Beef breeders	15–35 lb./day.

Most silage made in Queensland is suitable only for maintenance of stock, and requires some form of protein supplement for production.

Self-Feeding of Silage.

Self-feeding of silage from trench and stack silos has been done quite effectively with small numbers of stock.

In the case of trench silos, feeding gates are swung on a top pole or pipe which crosses the trench. These rest on the ground, lean forward and protect the uneaten silage from fouling. As the silage is eaten, the pole to which the gates are hung is moved along. This system requires a foot of feeding face for every two cattle fed.

Sometimes, an electric fence is stretched across the feeding face to control feeding.

Feeding out should be regular once a silo is opened, for when air is admitted the silage will develop mould. By removing a layer a few inches thick from the exposed surface every day, or the equivalent thickness every second or third day, mould does not develop.

Similar methods can be used for feeding out silage from stack silos.

Plate 1.

An Elite Merit Register Cow. "Trevor Hill Bonnie" owned by Mr. W. G. Henschell, Yarranlea. In nine lactations "Bonnie" has produced 130,693 lb. milk and 5,558 lb. butterfat.

Dairy Cows With Merit

By S. E. PEGG, Chief Adviser, Herd Recording.

Which of the following is the most profitable cow? One which produces a large amount in one lactation, calves at intervals of 18 months to two years and maybe then yields only an average or below average amount; or

One which calves regularly at yearly intervals, and at each lactation consistently gives an above-average yield of milk.

Assuredly, the answer to the question must be the second cow.

Some of our farmers have made great progress in increasing production through breeding by judging a cow on her lifetime production.

This is at variance with the general practice which has developed in this State, where cows have been rated on the yield of one lactation. This has resulted in undue attention being given to single outstanding records irrespective of the conditions under which they were produced, or the yield of subsequent lactation periods.

An examination of records shows that many cows have never had an outstanding individual lactation record, but, by regular yearly calvings, and moderate productions, have proved to be most profitable over the period they have been in the herd. Such cows are all too often overlooked.

The part played by each cow in the genetical make-up of the offspring must not be forgotten. Her contribution to the constitution and productive ability of the calf is equal to that of the sire. Therefore careful attention must be given to the selection of superior females to mate with the best sires.

It was to establish a permanent record of superior producing strains of dairy cattle that a Register of Merit for Dairy Cattle was introduced in 1952.

The Register was divided into two parts—female and male.

The female part was subdivided into Intermediate, Lifetime, and Elite sections. Entry into a section depends on the total production of a cow in a stipulated number of lactations.

Eligibility for entry may be gained by recording under either the Pure Bred or Group Herd Recording Schemes. Cows recorded under the former are entered automatically when they qualify

OWNERS MUST APPLY FOR ENTRY.

The owner of cows recorded under the Group Scheme must apply for the entry of such animals. This is a point of which many farmers are unaware. The reason is that with the large number of animals being recorded under the Group Scheme, some cows may escape notice inadvertently.

Therefore, if the owner of any herd being recorded under the Group Scheme considers that one of his cows may be eligible for entry into one of the sections of the Register, he should communicate with the Department of Agriculture and Stock.

Details of cows which have qualified each year are published with the Annual Pure Bred Production Recording Report.

It is hoped that farmers seeking new herd sires will pay more attention to cows in the Register of Merit than to those with one lactation record only. The selection of a sire from a consistently high-producing dam ensures a production backing which can be transmitted to his progeny.

FEMALE REGISTER OF MERIT.

Included in rules governing the entry into the Register are:

(*a*) *Intermediate Register of Merit.*

1. To qualify for entry, a cow recorded under the Pure Bred Dairy Cattle Production Recording Scheme or the Herd Production Improvement Scheme must have produced in three successive lactations, with not more than 18 months between consecutive calving dates, a total of at least 1,100 lb. of butterfat. If a cow commenced her first qualifying lactation at an age of less than two years 183 days, the figure will be reduced to 1,050 lb. of butterfat.

2. A cow must produce in each lactation at least 300 lb. of butterfat, except that in the case of a lactation commencing before the age of two years 183 days the minimum standard shall be 275 lb. batterfat

(*b*) *Lifetime Register of Merit.*

To qualify for entry, a cow must produce a minimum of 2,240 lb. of butterfat in not more than eight and not less than four lactation periods.

(*c*) *Elite Register of Merit.*

To qualify for entry, a cow must produce a minimum of 3,600 lb. of butterfat in not more than 10 lactation periods.

Production for each lactation shall be based on the first 300 days from commencement of recording.

All qualifying records produced under the Pure Bred Dairy Cattle Production Recording Scheme will be

automatically accepted. For records produced under the Group Scheme it will be necessary for the owner to make application for acceptance, and such application shall be accepted only if a cow is identifiable to the satisfaction of the Director of Dairying, and has been sired by a registered pure bred bull or a bull eligible for such registration.

Records subsequent to the issue of a certificate shall be added on application to the Director of Dairying, Department of Agriculture and Stock, Brisbane.

SIRES' REGISTER OF MERIT.

To qualify for entry, a sire shall be represented by:—

(1.) Five daughters in the Intermediate Register of Merit; or

(2.) Three daughters in the Lifetime Register of Merit; or

(3.) Four daughters distributed in the Intermediate and Lifetime Registers of Merit—that is, two in the Intermediate plus two in the Lifetime Register of Merit, or three in the Intermediate and one in the Lifetime Register of Merit.

Entry to the Register of Merit is based on actual butterfat production. No corrections are made for age, except for the allowance referred to in the qualifications for entry to the Intermediate Register of Merit. Thus the possibility of an error being introduced through any correction factor being in itself incorrect is avoided

Since the inception of the Register in 1952, 299 cows have qualiled for entry into the Register to 31st December, 1957. Details as to breed and section of the Register are shown in Table 1.

In all, cows from 82 herds have been entered in the Register. Of these, there are 30 A.I.S., four Ayrshire; one Friesian, three Guernsey and 44 Jersey herds. The number of cows ranges from one in some herds to as many as 17 in another.

TABLE 1.

NUMERICAL AND BREED COMPOSITION OF FEMALE REGISTER AT 31-12-57.

Section.	Breed.					Total.
	A.I.S.	Ayrshire.	Friesian.	Guernsey.	Jersey.	
Intermediate	99	9	..	12	130	250
Lifetime	16	2	1	1	24	44
Elite	4	..	..	..	1	5

Mr. W. Webster, Assistant Under Secretary (Technical), who, before receiving his present appointment, was Director of the Department's Division of Animal Industry. He graduated at Sydney University in 1927 and served in the Veterinary Division of the New South Wales Department of Agriculture before coming to Queensland in 1947. In 1950 he represented Queensland at the F.A.O. Conference on Livestock Problems in the Tropics at Lucknow, India. In 1954 he made an official visit to U.S.A., England and South Africa, to gain first-hand knowledge of advances in cattle tick control and cattle husbandry generally. Mr. Webster was president of the Australian Veterinary Association in 1957-58.

Tuberculosis-Free Cattle Herds. (As at 23rd July, 1958.)

Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongelea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy
Sullivan Bros., "Valera" Stud, Pittsworth
Reushle Bros., "Reubydale" Stud, Ravensbourne
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H.M. State Farm, Numinbah
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Woowoonga, via Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham
N. H. Sanderson, "Glen Valley," Monto

Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
W. E. O. Meir and Son, "Kingsford" Stud, Alberton, *via* Yatala
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnson, "Windsor" Jersey Stud, Beaudesert
W. S. Kirby, Tinana, Maryborough
S. A. Cramb, Bridge st., Wilsonton, *via* Toowoomba
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgeldie

Poll Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick.
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi

Compositional Quality of Milk

By L. E. NICHOLS, Dairy Research Branch.

The improvement of milk composition has been shown to be due mainly to the better feeding of dairy cattle.

It has been shown in surveys of milk composition over the past five years that there is a characteristic decline in milk composition during the late winter and early spring, which makes it difficult for producers to supply milk meeting the legal standards of composition. The decline coincides with a fall in the nutritive value of pastures.

In an attempt to further study this problem, arrangements were made for special samples to be taken by officers of the Division of Dairying and the Brisbane Milk Board, and chemical analyses on these samples were carried out by officers of the Dairy Research Branch. Cattle Husbandry Branch officers also collaborated in the work. The results obtained have yielded valuable information and have added greatly to the knowledge of the problem.

MANY COMPLAINTS.

During the six months ending January of this year many complaints were received from milk and cheese factory managements and suppliers, concerning low fat tests and low solids-not-fat percentages in milk supplies. Producers have had considerable difficulty in maintaining the solids-not-fat content of the milk from their herds above the presumptive legal standard. In other respects the compositional quality of bulk market milk has been affected and this concern has extended to the cheese industry where the cheese-yielding capacity of the milk supply not only markedly declined but further difficulty was experienced in maintaining the legal standards of composition of cheese. On occasions, it has been necessary to add cream to the cheese vat of milk so that cheese of legal composition could be made.

The seasonal difficulty concerning the compositional quality of milk has been accentuated by the recent drought and has further reduced the fat and solids-not-fat percentage of milk.

Much research work is being carried out in the important dairying countries of the world as well as in Queensland on the causes of the seasonal decline in milk composition. The presumptive legal standards for fat and solids-not-fat are 3.3 per cent. and 8.5 per cent., respectively. Milk giving figures below these values has been presumed to be abnormal until the contrary is proved. But of recent years results of genuine milk with a solids-not-fat below 8.5 per cent. have been increasingly frequent.

RESULTS OF BULK MILK ANALYSES.

In many cases, not merely milk from single cows but bulked milk from the entire herd has contained less than 8.5 per cent. non-fat solids and during the first six months of the present financial year a number of milk pasteurising plants showed a deficiency in the non-fat solids of their bulked milk, containing the milk from approximately 500 herds.

Queensland's average fat percentage in milk is 3.8 with a solids-not-fat percentage from 8.6 to 8.8, and no

difficulty is experienced in maintaining these standards during normal seasons. Since July 1957, the drought has caused a reduction of at least 0.4 per cent. in the average fat percentage of bulk pasteurised milk, that is, a reduction from 3.9 to 3.5 per cent. During the same period the non-fat solids percentage in milk declined from 8.6 per cent. to 8.2 per cent.

INDIVIDUAL FARM RESULTS.

Table 2 shows the results of analyses of bulk milk from a number of individual farms during October last. The samples of milk were collected at farms after milking operations had been supervised to ensure the genuineness of the sample. Tests were conducted in the laboratory to see that the milk as supplied was normal as regards freezing point.

All milks were genuine. The fat percentage of the evening milk ranged from 3 per cent. to as high as 5 per cent., whereas the morning milk showed a range from 2.5 per cent. to 3.6 per cent. With the exception of the fat percentage in the evening milk supply the results were substandard for total solids, solids-not-fat and fat percentage of the morning milk.

The majority of the low fat percentages recorded in the morning milk supply have been accentuated by the wide milking interval between the p.m. and a.m. milking. It is thus felt that the fat test of the morning milk supply when feed is poor can be appreciably improved by a more uniform milking interval of not less than 11 hours between the morning and evening milking nor more than 13 hours between the p.m. and a.m. milking.

However, it will be seen there is little difference in the solids-not-fat percentages recorded irrespective of the fat level of the morning and evening milk supply or the relative milking intervals, the majority being substandard. It would seem that a rise in the solids-not-fat percentage and a rise in the overall fat percentage can only be expected from a higher nutritional level of pastures generally or by a higher level of protein-concentrate feeding. This conclusion is supported by examination of Table 2 which shows the effect of improved pasture on the composition of milk from the same farms last March following good rain. Average rises of 0.5 per cent. in both the fat and solids-not-fat percentage were recorded. The improved seasonal effect on the composition of bottled pasteurised milk generally is also shown in Table 2 with rises of up to 0.5 per cent. in the fat percentage and 0.7 per cent. in the solids-not-fat percentage. The improvement in milk composition, as a result of dairy cows feeding on abundant good quality green pasture, following the recent rains, thus demonstrates the direct relationship of feed to milk composition. The results also illustrate the value of locally grown young green pasture grasses and crops in effecting improvement. It will be noted, however, that with the better level of feeding the effect of the milking interval on the fat percentage is not so marked.

FEEDING DEMONSTRATIONS.

In keeping with overseas findings, investigations have confirmed that the primary cause of the seasonal fall in milk composition is related to the nutritional standard of herds.

From funds provided by the Commonwealth Dairy Industry Extension Grant, feeding demonstrations are being conducted with a view to ascertaining ways of reducing the seasonal decline in the compositional quality of milk. Whilst the work is not finalised, there are certain indications. The fat percentage in milk would appear to be affected largely by the intake and quality of the roughage consumed by dairy cattle. Good quality hay or silage fed to cattle during the late winter and early spring has reduced

the decline in the fat percentage. The protein content of milk, the major factor in the solids-not-fat percentage, would appear to be increased by raising the intake level of protein in the form of grazed lucerne, young oats and wheat or concentrates. Irrigated pastures have also had a beneficial effect with a well maintained solids-not-fat and fat percentage. A good level of concentrate feeding with meat meal (up to 4 lb. per gal. of milk) has also proved helpful.

Based on these preliminary findings investigations are now under way to compare further the effect on milk composition of a good level of feeding with a poor level of feeding dairy cattle and a number of farmers in the Pittsworth, Beaudesert, and Atherton Tableland districts are co-operating in this regard. The effect of different crops and pastures, as well as minerals such as calcium, phosphorus and potassium are also being examined. In the Pittsworth district from funds provided by the Commonwealth Dairy Industry Extension Grant, lucerne-green panic pastures have been established and these have given promising results in raising the compositional quality of milk. This year, the effect of a good level of concentrate feeding and a good level of roughage feeding on milk composition, using identical twins, is also being examined.

IMPORTANCE OF FEED.

There is considerable evidence to support the belief that the composition of milk is influenced by the nutritive levels of the rations fed to the cows and the kind of foodstuffs. The lack of green feed during the late winter and early spring months is thought to be the main cause of a marked decline in the fat and solids-not-fat percentages in milk supplied from the Brisbane milk district. These trends of variation have been examined closely on three farms in the Beaudesert district. On the Darling Downs the decline in the non-fat constituents of milk appears to become more marked in January and February when drier pastures are prevalent.

Feeding trials have been carried out with the object of improving the solids-not-fat content of market milk. On one farm within the Brisbane milk district, commencing in the month of August, a six weeks' trial was conducted, feeding freshly cut, high quality, baled lucerne hay at the rate of 20 lb. per cow per day. However, only a slight rise in the solids-not-fat content of milk resulted but a considerable improvement in overall production and the fat percentage occurred especially in the morning's milk.

In another trial a mineral supplement (sterilized bone meal with a trace of potassium sulphate) was fed. No significant response in the solids-not-fat content of the milk was recorded for two months; thereafter a consistent improvement was obtained. The fat percentage in the morning milk of the fed animals was improved. The fat percentage of the morning milk from the fed animals increased from 3 per cent. to 4.3 per cent. The solids-not-fat percentage rose from 7.6 per cent. to 9.1 per cent., whilst the controls remained comparatively constant. The feature associated with the mineral feeding trial, however, was the apparent lengthening of the lactation period (up to 2 to 3 months) of the cows receiving the supplement. This and other aspects of the work are now receiving further consideration.

More evidence has also been provided of the effect of the type of feed on the yield and composition of milk. It has been shown that milk supplied from herds fed on lucerne-green panic pasture is superior in compositional quality to the milk from those fed on sorghum and sudan grass and paspalum and Rhodes grass. In several districts the lucerne-green panic pasture has not only arrested the seasonal decline in milk composition but has raised the total solids percentage of

the herd-milk by 0.3 per cent., with a corresponding improvement in the cheese-yielding capacity of milk. A similar effect on the solids-not-fat percentage is noticeable on the Downs in the late winter and early spring when young wheat crops and oats are grazed. However, the fat percentage is markedly lowered at this period of the year.

In subcoastal areas during the late winter and early spring the inclusion of silage and cereal or lucerne hay has helped raise the fat percentage by as much as 1 per cent.

On a subcoastal farm where a good level of feeding is normally practised with irrigated pastures (lucerne, green panic), hay and silage, the fat and solids-not-fat percentages have remained constant at approximately 3.8 per cent. and 8.6 per cent. respectively. However, with removal of the herd from the irrigated pastures, the solids-not-fat percentage of the milk declined to 8.2 with a similar decline in the fat percentage. On the Downs during the summer months when roughage is normally abundant following good rains and sorghum and Sudan grass is well-developed, the fat percentage is raised but the solids-not-fat percentage is lowered. At this period a corresponding decline in the cheese-yielding capacity of the milk occurs.

In coastal and subcoastal areas, following a normally dry winter, both the fat and solids-not-fat percentage in milk declines. As seasonal conditions improve and green feed becomes more abundant the fat and solids-not-fat percentages return to normal.

In an underfed herd, the feeding of up to 10 lb. of good-quality lucerne or cereal hay per day to the lower testing cows in addition to normal grazing raised the fat percentage by approximately 1 per cent—the solids-not-fat percentage, however, remained substandard between 8.1 and 8.2 per cent. Using a pair of identical twins the feeding of concentrates up to 4 lb. per gal. milk, and a similar quantity of good quality roughage the fat and solids-not-fat percentage was maintained at 4 per cent. and 9 per cent. respectively with an average yield of milk of 4½ gal. daily per cow. By feeding up to 30 lb. of good quality lucerne per day to the other twin, in addition to normal grazing, the fat percentage was well maintained, the solids-not-fat percentage, however, declined slightly and milk yield was reduced to 3½ gal. per day.

During the recent drought an overall decline in the fat and solids-not-fat percentages occurred in market milk and cheesemilk to the extent of 0.5 per cent. in each case during the six months ending December last year. Individual milk supplies showed declines up to 1 per cent. in both the fat and solids-not-fat percentages. With the breaking of the drought and the development of good green pastures the compositional quality of milk rapidly recovered and both the fat and solids-not-fat percentages returned to normal.

The influence and importance of feed in relation to the compositional quality of milk is thus emphasised.

Because of the possibility that the depressing effect on the fat percentage of milk may also be due to abnormal physical and chemical conditions in the rumen—mainly an abnormally low concentration of acetic acid—acetic acid is being tried in the ration. By effecting changes in the bacterial flora of the rumen and stimulating fibre breakdown it has been thought that a partial restoration of the fat content may be effected. Promising results have been obtained on a low roughage diet with acetic acid and the effect once stimulated has been prolonged. However, there are still a number of aspects of this work which require confirmation.

CONTROL MEASURES.

1. Feed.

To maintain the compositional quality of milk there can be no substitute for the better feeding of dariy cattle by way of irrigated pastures, hay, silage and, at certain times of the year, concentrates. All become a "must" during the late winter and early spring.

To prevent a pronounced decline in the compositional quality of milk from cows following calving in the early spring, it is necessary to feed "dry" cows at least a month before calving on a well-balanced concentrate—roughage ration.

2. Herd Recording.

Herd recording, with the "culling" of consistently low-testers, is the only sure way of maintaining the fat-producing ability of the dairy herd and continuous testing is essential if the fat percentage of bulk milk is to be maintained. Some countries are considering the inclusion of a solids-not-fat test in herd recording work and a rapid field method for the determination of solids-not-fat is being examined in association with the C.S.I.R.O. In field testing there is little doubt that the total solids content of individual cow's milk could be regularly examined with the aid of the Specific Gravity Hydrometer and the Babcock test and prove helpful in rejection of cows which consistently yield milk below standard. Supported by periodic laboratory checking of bulk farm milks for total solids, the results could prove a valuable aid and guide to the farmer in both his breeding and feeding programmes.

3. Culling.

Following a generally good standard of feeding under normal seasonal conditions, cull cows which consistently yield milk low in percentage of fat and solids-not-fat.

4. Breed.

There is a tendency to breed for volume with payment for market milk on a gallonage basis. However, greater emphasis is now being placed in some overseas countries on payment for milk on butterfat. Consideration is also being given to a total solids payment in America, where both the fat and solids-not-fat percentages are taken into account.

In the meantime, farmers should take cognisance of both the fat and solids-not-fat percentage of their herd milk and where these are consistently low, they should adjust breeding and feeding programmes accordingly.

There is a relationship between the butterfat and the solids-not-fat percentage of milk. The milk of groups of cows with the highest average butterfat percentage also has the highest average solids-not-fat percentage. Therefore progeny with high butterfat lactation records will also have a high solids-not-fat potential.

The following table shows the different breeds in relation to their milk composition:—

TABLE 1.

Breed.	Water.	Total Solids.	Fat.	Solids-Not-Fat.	Ash.
Guernsey ..	85·13	14·87	5·19	9·68	·74
Jersey	85·31	14·69	5·18	9·51	·70
Ayrshire ..	86·89	13·11	4·14	8·97	·68
Holstein.. ..	87·50	12·50	3·55	8·95	·68
Shorthorn ..	87·43	12·57	3·63	8·94	·73

FARM REFRIGERATION.

Appreciating the higher fat percentage in the evening milk supply as compared with the morning milk, particularly on a low plane of nutrition and the difficulty at times in suitably adjusting milking intervals more uniformly because of variable milk pick-up times, many farmers have installed farm refrigerators so as to permit the evening and morning milk supply to be mixed. As a result the average test of the morning milk delivery has been raised.

CONCLUSIONS AND SUMMARY.

1. The normal seasonal decline in milk composition is due to the generally lower nutritional value of pastures following a dry, late winter and early spring and particularly an imbalance in the concentrate—roughage ration available for dairy cattle. Therefore, feed good quality roughage (hay or silage) during the late winter and early spring and maintain a good balance of concentrate—roughage feeding. For this purpose, fodder conservation

TABLE 2.

RESULTS OF TESTING FARM MILKS.

During the Early Spring and Drought of 1957, and After Drought—March, 1958.

Evening Milk.					District.	Fat %.	Morning Milk.		Milking Intervals (hours).
Month of Test.	Farm.	Fat %.	T.S. %.	S.N.F. %.			T.S. %.	S.N.F. %.	
Oct., 1957	A	3·5	11·5	8·0	Bethania ..	3·6	12·1	8·5	11½ and 12½
Mar., 1958	A	4·5	13·2	8·7		4·5	13·6	9·1	10 and 14
Oct., 1957	B	3·4	11·8	8·4	Lindum ..	3·0	11·5	8·5	11 and 13
Mar., 1958	B	4·5	13·0	8·5		3·5	12·1	8·6	
Oct., 1957	C	3·7	11·7	8·0	Bunya ..	3·3	11·5	8·2	11 and 13
Mar., 1958	C	4·6	13·0	8·4		3·7	12·4	8·7	
Oct., 1957	D	3·6	11·7	8·1	Bunya ..	2·9	11·1	8·2	9 and 15
Mar., 1958	D	4·3	12·6	8·3		4·6	13·2	8·6	
Oct., 1957	F	3·4	11·6	8·2	Lower Mount Walker	2·7	11·1	8·4	10½ and 13½
Mar., 1958	F	4·0	12·8	8·8		4·0	12·9	8·9	10 and 14
Oct., 1957	I	3·2	11·1	7·9	Lindum ..	2·7	10·9	8·2	9½ and 14½
Mar., 1958	I	4·3	13·1	8·8		4·0	13·0	9·0	
Oct., 1957	J	3·7	11·3	7·6	Nindooinbah	2·7	10·7	8·0	9 and 15
Mar., 1958	J	4·2	12·8	8·6		3·3	11·9	8·6	
Oct., 1957	K	3·9	11·7	7·8	Moggill ..	2·8	10·5	7·7	10½ and 13½
Mar., 1958	K	3·7	12·3	8·6		3·0	11·7	8·7	
Oct., 1957	L	5·0	13·1	8·1	Moggill ..	3·4	11·5	8·1	8 and 16
Mar., 1958	L	5·3	14·0	8·7		4·0	12·7	8·7	
Oct., 1957	M	3·0	11·2	8·2	Kilcoy ..	2·5	10·4	7·9	10¼ and 13¾
Mar., 1958	M	4·3	12·9	8·6		4·0	12·4	8·4	10 and 14
Oct., 1957	N	4·0	12·0	8·0	Booval ..	3·4	11·6	8·2	11 and 13
Mar., 1958	N	4·3	13·4	9·1		4·7	14·0	9·3	11 and 13
Oct., 1957	O	4·0	12·4	8·4	Flinders ..	3·2	11·0	7·8	10¾ and 13¼
Mar., 1958	O	3·8	12·5	8·7		3·5	12·2	8·7	11 and 13
Oct., 1957	P	3·4	11·7	8·3	Caboolture	3·0	11·6	8·6	9 and 15
Mar., 1958	P	4·7	13·6	8·9		4·8	13·7	8·9	9 and 15

Pasteurised Bottled Milk reflected a similar improvement because of the improved seasonal conditions and better pastures, namely:

	Fat %.	Total Solids %.	Solids-Not-Fat %.
October, 1957	3·5	11·7	8·2
March, 1958	4·0	12·8	8·8

is essential with supplementary feeding during the winter and early spring.

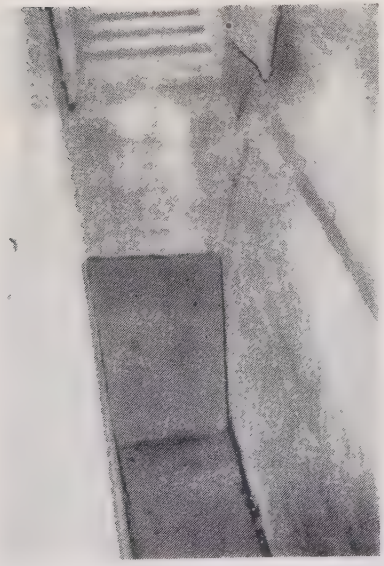
For the average Queensland dairy farm one of the best insurances against a decline in the solids-not-fat and fat percentage of bulk herd milk is 5 to 10 acres of irrigated pastures containing lucerne, prairie grass, green panic, or Rhodes grass mixtures. For maintenance of the fat percentage the feeding of conserved cereal hay with some silage will prove helpful. Apart from improved milk composition such practices have also given an over 50 per cent. increase in milk yield per cow.

2. There is little doubt that the high incidence of spring calvings by cows low in condition is contributing to the decline in milk composition. Therefore, it is sound practice to "steam-up" cows about one month prior to calving with a suitably balanced concentrate—roughage ration.

3. Wide milking intervals accentuate the low fat percentage in the morning milk supply, especially on a low plane of nutrition. It is therefore necessary to adjust milking times for more uniform intervals particularly during the late winter and early spring, if milk of substandard composition is to be avoided.

4. Where farm refrigeration is available, the evening and morning milk supply may be bulked to raise the fat percentage of the morning milk delivery.

Concrete Wedge for Dip



HERE is a concrete wedge in the bottom of a dip at the "jump in" end. Built into a DDT (or other hydrocarbon) dip it gives better stirring of the mixture.

A build-up of mud in that spot sometimes stops a good wetting when cattle jump in. The wedge-shaped block of concrete prevents this.

It saves DDT and other mixtures too.

—W. R. RAMSAY, Veterinary Officer.

☆ ☆ ☆

RIDDLE.

Q. When can a dead pig on a farm be as valuable as a live one?

A. When a vet. has done a post mortem and you know how to save others.

Brucellosis-Tested Swine Herds

(As at 23rd July, 1958.)

Berkshire.

A. P. and N. Beatty, "Deepdene," Barambah road, Nanango
S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
H.M. State Farm, Numinbah
G. L. Gabanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfeld" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
V. F. Weier, "Sa Crescent," Clifton
N. Rosenberger, "Nevrose," Wyreema
B. Osborne and Dr. J. W. Best, Miltown Stud Piggery, Warwick
W. Young, Kybong, via Gympie
E. J. Clarke, Mt. Alford, *via* Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
J. W. Bukowski, "Secreto" Stud, Oxley
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
D. Ludwig, Cainable, via Beaudesert
J. & S. Kahler, East Nanango

Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
B. J. Jensen, "Bremerside" Stud, Rosevale, *via* Rosewood.
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
V. P. McGoldrick, "Fairymeadow" Stud, Cooroy
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabarlah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
K. B. Jones, "Cefn" Stud, Pilton road, Clifton
Barron Bros., "Chiltern Hill," Cooyar
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba.
P. F. Ives, Capalaba
D. Ludwig, Cainable, via Beaudesert
J. C. Lees, "Bridge View" Stud, Yandina
R. Rhodie, Clifton
C. Assenbruck, Mundubbera
A. J. Mack, Mundubbera

Tamworth.

D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
F. N. Hales, Kerry road, Beaudesert
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M. S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook

Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville
R. A. Collings, "Rutholme" Stud, Waterford
A. J. Mack, Mundubbera

Large Black.

E. Pointon, Goomburra

The First Eight Weeks of a Pig's Life

By G. W. OSBALDISTON, Assistant Husbandry Officer.

A pig's most important growing period is the first eight weeks of its life. The thriving piglet at eight weeks has a much better chance of developing into a profitable, mature animal (which, if of the correct type will yield a good quality carcass) than has the piglet that is making only slow growth.

A sow's milk production reaches a peak in the third week after farrowing and then decreases in volume till, by the ninth or tenth week, the milk flow ceases.

A week or 10 days after birth, the suckers show interest in other feed. As the milk supply decreases, this interest develops and the piglet depends more and more on the supplementary food provided. At eight weeks of age it may make up the great bulk of the diet. Experiments show that piglets fed an adequate supplementary feed are healthier and heavier than those reared solely on sow's milk.

As a piglet grows, it increases in size and weight. Enlargement of the skeleton contributes to both increases but that in weight is due also to development of body tissues, especially muscles and skin. The building blocks for the skeleton and tissue are mineral and protein respectively. The source of both is the diet, and so the ration fed to the young piglets must be adequate in these two requirements. Sow's milk is a good source of minerals required for skeletal development and, as well, is rich in a highly digestible protein. Clearly, the supplementary feed must be very nutritious and palatable if it is to match the sow's milk.

Nevertheless, sow's milk is rather deficient in some of the blood-forming minerals, especially copper and iron and as additional amounts of these can be given in the supplementary meal the latter may be better in at least one respect.

Feed Requirements.

Desirable features of a supplementary feed are that:—

(*a*) It contains large amounts of highly digestible protein. The best source of such protein is milk powder, which is also rich in minerals and, as we have seen, minerals are essential for the development of the skeleton. Milk powder is a good source of energy as well as being palatable and readily digested, and so is an ideal foodstuff.

(*b*) It be rich in energy. Growth requires food energy and so the more energy the piglet can consume in the food the quicker the growth is likely to be. The ideal source of energy is dextrose, a form of glucose; however this is an expensive foodstuff and so may only be included in the ration at a low level. Cane sugar is a good source of food energy but it is not so easily digested as dextrose. Both dextrose and cane sugar are very sweet and very palatable to the piglet. Fats and oils are expensive sources of energy but may be included in the supplementary meal at low levels.

(*c*) It supplies adequate amounts of those minerals not found in sufficient quantities in sow's milk. Iron, copper and salt are the ones concerned.

(*d*) It be low in fibre content. Fibrous foods are poorly digested by the young piglet and these should not be fed. Hay and chaff should not be included in these rations. At the Biloela Regional Experiment Station, it has been shown that adding 11 per cent. of good quality lucerne hay to a highly nutritious ration affected the growth rate of the piglets to a marked degree.

(*e*) The food be palatable. The piglet must enjoy eating the food or he will not consume as much of it as desirable. Piglets show a marked preference for a sweet flavour.

Suggested Meal.

A suggested supplementary meal for piglets under Queensland conditions is:—

	Parts by Weight.
Finely ground grain	25
Buttermilk or skim-milk powder	40
Raw sugar	10
Peanut Oil (or stabilised lard or beef tallow)	10
Pollard	5
Livermeal	10

The addition of antibiotics to this ration may be beneficial. The addition of vitamin A and the B group is not considered necessary when the sow is receiving adequate vitamin A in her ration, and milk powder is included in the supplementary meal.

Supplementary meal or creep feed should be self-fed and it is found that the piglets prefer fresh meal to stale meal. For this reason put only a small amount of food into the feeder at a time so that it will be frequently replenished with fresh food.

Clean Water Important.

Clean water should be available at all times. Although water has no nutritional value as a food, it is most important for the well-being of the piglet. All pigs will show more interest in dry food if they can have a drink whenever they care to. Admittedly, water is tasteless but it helps to make dry meal palatable. Milk powder, being a very fine food, may adhere to the sides of the piglet's mouth and a drink of water will relieve discomfort. For obvious reasons, a piglet is less contented when it is thirsty than when it is not thirsty. To have clean water always available is most important.

Creep feed should be available to the piglets when they are seven days' old so that by three weeks of age they will be eating it freely. Piglets which are put onto creep feed without any previous experience will take two to four days to eat it in any quantity. The creep should be placed in an easily accessible position and feed be available at all times. Where piglets do not take readily to eating creep feed, it is wise to place some of it in the piglet's mouth by hand. This should be repeated at 12-hourly intervals. Once a few piglets partake of the creep feed readily, the others soon follow. Alternatively if one or two already trained in eating creep feed are placed in with the newly weaned piglets, they will soon teach the others to do likewise.

The success of early weaning is dependent on two factors:—

(a) Palatable and nutritious diet:
(b) Good husbandry and management.

Early weaned piglets do not require a large area to live in; overseas researchers suggest six square feet per piglet at three weeks' old and eight square feet per piglet at eight weeks' old. Overcrowding is, of course, undesirable.

The pen must be draught-free and dry. The dryness of the floor is of utmost importance as wet floors (and patches) may cause chilling followed by scouring and death. The ideal floor covering for an early weaning pen is a few inches depth of coarse sawdust.

Food must be easily accessible and always available. It should be fed in a long, shallow trough designed like a chicken feeder. At least four inches of trough space should be allowed for each piglet.

Synthetic Sow's Milk.

If a sow dies when the piglets are too young to partake of dry meal, synthetic sow's milk must be fed. The rearing of piglets on such milk is practicable and economical only if scrupulous hygiene and sound management are practised.

Synthetic sow's milk may be made up as follows:—

1 pint fresh cow's milk.

2 tablespoons of cream.

2 tablespoons skim-milk or buttermilk powder.

The three ingredients are mixed so that milk powder is dissolved in the cow's milk.

Synthetic milk is best fed in a wide shallow tray on an area which can be throughly cleansed after each meal. The piglets are encouraged to drink by dipping their snouts into the milk a few times. After the piglets have learned to drink, a drinking vessel which will not permit them to stand in the milk should be substituted.

To commence with, milk should be available to the piglets for five minutes at a time every one and a half hours. A little and often, is the rule. If it can be arranged it is advisable that at least one drink be given at night. Piglets fed in this manner should grow as well as those fed sow's milk. Hygiene, however, is of vital importance and the following procedures should be routine:

(a) Cleanse the feed dish thoroughly after each meal.

(b) Cleanse the floor after each meal, or as often as practicable. At least once a day treat the area with a good antiseptic.

(c) Feed only fresh milk.

Dry, warm housing must be provided. An igloo made of baled hay, so that the piglets have a cosy, draught-free corner, is a useful adjunct. Piglets weighing more than seven pounds should be taught to eat creep feed without delay.

The Economics.

As a general rule the heavier the piglet at eight weeks, the quicker the pig will grow thereafter and the more economical the bacon it will produce. The importance of time from the economic viewpoint is summed up by an economist who wrote "the rate of turnover is directly related to the profits."

Studies of pig production economics have shown the relationship between heavy weaning weight and profitable bacon production. But is it profitable to feed expensive rations to pigs before they are weaned? The answer is "Yes."

Trials conducted at the Department's three Regional Experiment Station piggeries have shown that under eight weeks of age, piglets have a food conversion ratio of 2·5:1 and less. In 50 per cent. of our trials food conversions of less than 2:1 have been recorded. Similar results are reported from overseas. These food conversion ratios show that the piglet can handle dry meal very efficiently. On a high quality ration such as the supplementary feed given, the food conversion ratio should be even lower than 2:1, and so it becomes profitable to feed it.

The long-term effect must of necessity also be kept in mind in view of the fact, as already stated, that the old is likely to do better than a less rapidly growing pig later on also.

Birdsville Disease Of Horses

Clear-cut results of tests provide scientific proof that the baffling Birdsville disease of horses is another type of plant poisoning.

A statement on Birdsville disease issued recently by the Department sets out the findings of the veterinarians and botanists who studied the disease.

The statement explains that the cause of the disease has been tracked down to a legume. This plant, commonly called Birdsville indigo, is known to science as *Indigofera enneaphylla*. It grows in inland Australia, usually on silty flats and gullies and near the foot of washed, pebbly slopes.

Some graziers, however, have been reluctant to accept the explanation that Birdsville disease is a plant poisoning. They base their objection on two grounds, firstly that the plant occurs in areas where the disease is unknown; and secondly, that the disease is said to occur in areas where the plant does not grow.

LARGE QUANTITIES POISON.

It is well known that Birdsville indigo occurs over a much wider area than Birdsville disease. However, tests showed clearly that horses must eat quite large quantities of the plant to produce symptoms. It follows, therefore, that the only areas in which the disease will be a problem are those in which the indigo constitutes a fair proportion of the feed.

The second objection is more serious. Of the many cases of Birdsville disease so far investigated, none has occurred in horses that did not have access to Birdsville indigo.

The statement continues: "The Department is most anxious to investigate any case of Birdsville disease in horses which did not have access to Birdsville indigo. Any graziers with affected horses in areas where the plant is not growing are asked to report the disease at once. Advise your local Stock Inspector, Advisory Officer or United Graziers' Association branch, and these authorities will communicate with the Department's Head Office."

Investigations into the Birdsville disease problem were stepped up as far back as 1947. Studies by the Queensland Department of Agriculture and Stock in that year indicated that a poisonous plant was responsible for the disease.

In 1949, a systematic study of the areas where Birdsville disease occurs narrowed down the search to a few plants. Of these, Birdsville indigo, which grew in all the paddocks where the disease was seen, was the most likely suspect.

PROOF FROM FEEDING TRIALS.

Feeding trials were started by Northern Territory officers as soon as Birdsville indigo was suspected in Queensland. Every one of the 14 horses fed the plant developed Birdsville disease. But those not fed the plant remained healthy.

Quantities eaten before symptoms developed ranged from 55 lb. to 270 lb. of the fresh plant, but were mostly 150 to 200 lb. The interval between the first feeding and the onset of

Plate 1.

Birdsville Indigo (Indigofera enneaphylla). A, habit; B, leaf; C, flower; D, cluster of pods; E, pod; F, pod in section; G, seed. (A, natural size; B, slightly enlarged; C, D, E, F and G, enlarged.)

symptoms varied from two weeks to about three months. Horses which ate the most each day developed the disease most rapidly.

Confirmation of these results came from experiments in Queensland the following year.

HOW IT AFFECTS HORSES.

The statement indicates that the disease is a serious problem in some inland districts of Queensland, Northern Territory and Western Australia. It is a nervous condition affecting horses, but not other livestock. The first sign of trouble is often dullness and sleepiness. This is followed by wobbling of the hindquarters and dragging the hind toes, eventually wearing down the hoof.

Sometimes the disease progresses no further than toe-dragging and difficulty in turning. But many horses are more severely affected—staggering, lurching and falling down. Some horses lurch around in tight circles, pivoting on the front feet. Others develop fits in which the limbs are extended and the muscles become rigid. Even horses which are only slightly affected may suddenly collapse when ridden hard.

So far chemists have not been able to isolate the poisonous principle in Birdsville indigo. As a result, no treatment is yet known except to remove affected horses from the plant and, if possible, to hand feed them.

Where Birdsville disease occurs, the plant is usually so abundant and the carrying capacity so low, that chemical or mechanical destruction of the plant is not economically feasible.

The best method of controlling the disease is to fence off another horse paddock on country free of the plant. On a few properties this is not possible, and in these places the only reliable method of control is to hand feed the horses during those periods when the plant is available.

Ear-tagging of Lambs

A Brisbane Valley fat-lamb farmer bought 1,400 plastic ear tags in 10 different colours. He tagged all his in-lamb ewes in series of 10 tags to each colour. As they lamb he intends to tag each lamb with the same number and colour tag as its dam.

Tagging will allow full records to be made of the origin and progress of each lamb up to marketing. Analysis of the records will give useful information on relative fertility of the different ewes year by year. The farmer intends to remove the lamb tags at marketing, and re-use them for each season's lamb drop. Ear-tagging in a small flock allows rapid identification or recording to be made in relation to any operation in sheep husbandry.

Plastic tags are best inserted on the front of the ear, and should always be put on the age mark ear, and towards the tip to make for easier reading when the sheep is in wool.

—Sheep and Wool Branch.

Don't Let Worms Drain Your Horses' Strength

By M. S. STEVENS, Divisional Veterinary Officer.

You can increase the horse power on your property by reducing the population of internal parasites in your horses.

In every part of Queensland, horses are affected by some type of worm parasite or bot, which constantly, and insidiously, drains their strength.

You will never get rid of all these parasites, but if you treat the horse at the right time, you will kill most of them. This will cause a big improvement in the horse's general health and appearance and it will increase his stamina and endurance.

In this way you may be able to work your property with fewer horses. A healthy horse does not tire so quickly as a horse full of parasites, and he will recover much more rapidly.

(1) THE ROUNDWORMS.

At least some type of roundworm lives in horses in every part of this State. They are often very harmful.

(*a*) Large Roundworms. (*Parascaris equorum*).

These worms live in the small intestine. They grow as thick as a pencil and sometimes up to 20 in. long. The usual length is about 9 in.

Life Cycle: The female worm lays some 200,000 eggs a day which are passed out in the droppings. A larval worm develops in each egg in about 10 days. Once the eggs are swallowed with the food or water, they hatch in the intestine, burrow through the wall of the gut and reach the liver. From there they are carried in the blood through the heart, to the lungs, where they grow and moult. From seven to 23 days after infection the larvae crawl up the windpipe to the back of the mouth, then down the gullet to the small intestines. There they grow into adult worms in eight to nine weeks.

Harmful Effects: Foals especially suffer from this parasite. The migrating worms damage the gut, liver and lungs, and the adults may block the gut.

Signs: Affected horses often cough, become unthrifty, are easily tired, show a harsh coat and have attacks of colic.

Under Queensland conditions Large Roundworms are not common in adult horses. They are mainly found in foals, especially in those confined to small permanent paddocks and stalls. For this reason they are more common in highly developed areas and soon die out under open range conditions.

(*b*) Red Worms. (*Strongylus vulgaris*, S. *equinus*, S. *edentatus*).

Red Worms live in the caecum and large intestine. They are worms up to $1\frac{3}{4}$ in. long; dark grey to red colour, depending on the amount of blood they have sucked. These worms are found even in brumbies in far western Queensland and central Australia.

Life Cycle: The eggs pass out in the droppings and hatch into larval worms. They moult several times before they penetrate the gut wall, and depending on the species, migrate through various body tissues and organs. The most common type, *Strongylus vulgaris*, enters the wall of

the main artery supplying blood to the intestines. There it may produce a thickening of the arterial wall (aneurism) which often partially occludes the lumen and reduces the blood flow to the intestines.

Harmful Effects: These worms have large mouths with which they bite into the gut lining, digest it, and often cause it to bleed. Horses may show anemia, soft droppings with a bad smell, loss of appetite, a rough coat, and lack of endurance. The migrating worms are harmful and by damaging the blood supply and nerves supplying the intestines they cause severe attacks of colic. Other harmful effects of a complicated nature can result from the activity of these parasites.

(*c*) Pin Worms. (*Oxyuris equi*).

Pin Worms live in the large intestine. They are quite a thick worm with a long thin tail. They are a white to brownish colour and up to 6 in. long.

Life Cycle: After mating, the female worm passes through the rectum and hangs from the anus. There she lays cream-coloured eggs, which are attached in clusters to the clear skin. This egg laying is done at night. The eggs drop off in three days and are swallowed by the horse with its food. The larval worms feed off the lining of the large bowel. As adults they live free in the lumen and live off the ingesta.

Harmful Effects: The egg-laying habits of the worms causes itching, and the horse rubs the base of its tail on suitable objects. Large numbers of worms cause loss of condition and a dull coat. Horses introduced from affected areas may cause infestation in drier areas for some time.

(*d*) Stomach Worms. (*Habronema musca*, H. *microstoma*, *Draschia megastoma*.

Stomach worms are small, about ¾ in. long. They are prevalent all over Queensland even in the dry areas of the west such as Birdsville.

Life History: The eggs have hatched into larvae before they pass out. They are eaten in the droppings by the maggots of house, bush and stable flies. They develop further in the fly and pass out its proboscis as it feeds. If this is about the mouth of the horse, they are swallowed and develop into adults in the stomach. Flies can also be taken in with the feed and water.

Harmful Effects: The worms cause inflamation of the lining of the stomach and one species can cause the formation of tumours (large swellings) of the wall.

The larval worms escape from flies which congregate round the eyes. They form a tumour on the third eyelid in the inner corner of the eye. This type of tumour can also form about the penis and prepuce.

Larval stomach worms are frequently found associated with the rough cancer-like growths on the legs and belly. These are often referred to as swamp cancer.

Although these larvae were formerly thought to cause swamp cancer, this now seems very unlikely and the association is probably only accidental.

(2) TAPEWORMS. (*Anoplocaphala perfoliata*, A. *magna*).

These are flat, segmented worms, which live in the small intestines. They are quite commonly found, though heavy infestations are rare. It is not usual to treat for these worms.

(3) BOTS.

(*a*) Common Bot—*Gasterophilus intestinalis*.

(*b*) Throat Bot—G. *nasalis*.

(*c*) Nose Bot—G. *haemorrhoidalis*.

The common bot is widespread in Queensland and penetrates into the western country. The nose bot has

not been reported in this State. The flies are brown in colour, hairy, and about the sige of a bee.

Life Cycle: The adult females hover near the horse before darting in to cement an egg to a hair.

Throat bots lay under the jaw and throat, whilst the common bot chooses the front legs, shoulder, mane and sometimes the hind legs.

The eggs of the throat bot hatch in six days and crawl into the mouth. The eggs of the common bot hatch in seven days and reach the mouth as the horse muzzles its legs.

They enter the surface lining of the lips, cheek and tongue and wander there for several days or they form pockets between the cheek teeth. Later they wander in the tissue of the gullet before attaching to the lining of the stomach where they mature. This takes from eight to twelve months.

After that time the larvae pass out in the droppings and pupate in the soil. They remain in this state for three to ten weeks and emerge as adult flies.

The flies live for less than a week.

Throat bot flies are seen in spring and early summer and the common bot in autumn and early winter.

Harmful Effects: The flies of the throat and nasal bot worry horses. They frequently rear and bolt when attacked. The larvae wandering in the tissues of the mouth interfere with feeding. The larvae attached to the stomach cause deep pits in the lining. Their excretions are toxic and cause general debility.

GENERAL CONTROL MEASURES.

Roundworms.

Improved management is the best way to deal with infestations of Large Roundworms. Brood mares should be treated during pregnancy, and turned into a spelled paddock till after foaling. Piperazine is an effective drug for this purpose.

Plate 1.

Insertion of Nasal Tube. Note that tube is passed under thumb inserted in nostril and kept close to the mid line.

Bots.

The eggs of the common bot can be rubbed with warm water at 105 deg. to 110 deg. F. This stimulates hatching and the larvae die. Vigorous grooming with a stiff brush will assist in removing eggs. Protective veils can be applied to prevent throat and nasal bots laying their eggs. All bot flies dislike shade and the provision of darkened shelters will reduce attacks.

TREATMENT.

The following drugs are used:

(*a*) *Carbon bi-sulphide.* Effective against bots, stomach worms. Dose at the rate of 6 drams per 1,000 lb. after fasting for 18 hours. When treating stomach worms it is necessary to dissolve the mucus in which the worms lie. Do this by giving one gallon of 2 per cent. solution of sodium-bi-carbonate through a nasal tube, before giving the carbon-bi-sulphide. A nasal tube is the most certain and satisfactory way of giving medicaments to horses. Proper tubes can be bought from veterinary suppliers but you can easily make one from a 5 ft. length of ½ in. plastic hose. Just smooth one end with a knife and paper abrasives. You will need a funnel to fit the other end.

Plate 2.

Nasal Tube, Funnel, and Measuring Jug.

To use the tube, lubricate the rounded end with petroleum jelly. Then run it up the floor of the nose by guiding it under a thumb held in the nostril. When the end of the tube meets resistance at the back of the throat make gentle thrusting movements until the tube enters the gullet. If you look on the left hand side of the horse's neck, you may see the end of the tube passing down. A bubble of air blown down the tube will be seen to pass along the neck. Once you see that, you can pour the medicament into the funnel. The best time to treat for bots is in August or early September, when they will all be attached to the stomach.

Carbon bi-sulphide can also be given in a capsule known as a bot bomb.

It is an inflammable liquid and should be handled with care.

(*b*) *Phenothiazine* particularly is used for Red Worms, but will remove some Large Roundworms and Pin Worms. This drug can poison horses and it is not safe to give more than 1 oz. weight of powder (equals 2 oz. of liquid) at one dose to the average stock horse. It can be given in the feed or by the nasal tube. No starving is necessary. This drug can be given at the same time as carbon bi-sulphide. Therefore if you use a nasal tube you can treat for all worms and bots at the one time.

(*c*) *Piperazine compounds* are about as effective as is phenothiazine against the same species of the Red Worms. It will remove almost 100 per cent. Large Roundworms and has some effect against Pin Worms. This drug is not poisonous. It acts as a narcotic to the worms and so they are expelled. It is given at the rate of 10 gm per 100 lb. live weight in the feed or water or by the nasal tube. Increased doses (up to 18 grammes per 100 lb.) are necessary to get complete efficiency against Pin Worms.

Plants That Yield Prussic Acid

By S. L. EVERIST, Government Botanist.

The name "prussic acid" conjures up a fearful picture of sudden death. You might expect that any plant containing prussic acid would be deadly. How, then, can we account for the fact that crops like sorghum and sudan grass, which yield this poisonous substance, are eaten every day by thousands of animals without any ill effects?

Eating plants containing prussic acid is like crossing a busy street or riding in a motor car—safe enough under ordinary circumstances but liable to be fatal if you are careless or unlucky. When losses do occur, they are usually swift, sudden and disastrous. You can help to avoid them by learning to recognise the plants likely to cause trouble and by getting to know the conditions under which poisoning is likely to take place.

Plate 1.

Native Fuchsia Bush. Mature plant at Blackall.

RELEASE OF DEADLY GAS.

Prussic acid itself is a gas which is not present in the plant as such; it is combined with sugars to form what are known as glucosides or glycosides. The glycosides are not poisonous to the animal and they must be broken down in the course of digestion before the poisonous prussic acid is released. That is why many plants that yield prussic acid are eaten safely by many animals. *Trouble occurs only when conditions are such that the glycosides break down rapidly, allowing the prussic acid to be absorbed into the bloodstream.*

Some hundreds of different plants are known to yield prussic acid and we have space to mention only a few.

Nearly all sorghums yield some prussic acid, sometimes large amounts, sometimes small. The amount varies greatly with the kind of sorghum and is influenced by stage of growth, seasonal conditions, weather and soil.

Wild sorghum and Johnson grass generally yield more than pure sudan grass or grain sorghums; sweet sorghums fluctuate widely. Young shoots are more dangerous than older ones and experience has shown that the most dangerous stage is when there are lots of young side shoots. There is some evidence to suggest, too, that the danger is greater when these side shoots have been wilted by dry, hot weather and if there is heavy dew, mist or light drizzle at the time they are eaten.

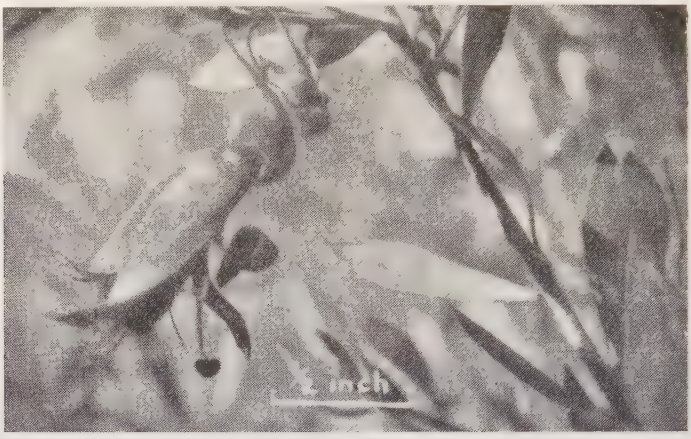


Plate 2.

Native Fuchsia Bush. Twig with leaves and flowers.

In western Queensland, the commonest plant which yields prussic acid is the native fuchsia bush, a compact shrub about 2 ft. high with bright green leaves and dark red tubular flowers which are spotted inside. Although this plant yields enormous quantities of prussic acid, sheep and cattle grazing quietly in the paddock eat it regularly without coming to any harm. Starve those same animals and drive them through it or put a mob of travelling sheep on it and there's a different story. Losses then are likely to be very heavy and very rapid.

DANGEROUS WHEN YOUNG.

The native couch grass is another plant which has caused disastrous losses in some western areas. Unlike the common couch, the native couch is an annual which comes up in the summer and dies down in the winter. The seed-head looks like the common

Plate 3.
Common Native Couch.

couch but it is rather coarser and stiffer. When this plant is young it is dangerous. In some travelling mobs, more than 1,000 sheep have died within an hour of eating the grass whereas, at the same time, full, well fed sheep have travelled over the same stock routes without a single head being lost.

Obviously, recognition of the plant is essential if you are to take precautions to prevent losses of this kind. *If you are in doubt about the identity or the properties of any plant, do not hesitate to take it to your local officer of the Department of Agriculture and Stock, or, if you prefer, wrap it up and send it direct to the Government Botanist in Brisbane.* Do not forget to put your name and address on the package and to send a covering note asking for the information you want.

A Letter From Ballyrandoo

My dear Son,—Your letters are a great comfort to your Mother and me. With increasing age, I find I have to leave more to the men; however, this has its usefulness. It seems that if age decreases capacity for active work, as a compensation it brings opportunities for reflection. As sheepmen are generally "men of their hands," rather than "of their head," planning is sometimes neglected. More than ever I am coming to realise how important planning is, and how much youth, with its insatiable energy, is apt to overlook this form of approach to life.

I realise that always having been very keen on improvements, I may at times have failed to think enough about the stock. Over-concentration on one aspect of management can result in the neglect of others.

As a case in point, I have been giving consideration to the practice we have followed year after year of classing out a certain percentage of our maiden ewes. Culling is actually of little use in flocks that are not replacing themselves with sufficient surplus young sheep to permit this. Here, the aim should be to increase lambings by improved methods of management. A continuous and arbitrary standard of culling carried out in a flock with low lambing percentages will, sooner or later, run against the problem of no flock to cull. If, to meet such a decline in numbers, the owner buys replacement ewes, his culling programme to obtain an even flock has been largely wasted.

Again, with the problem of sheep worms, control must be guided by seasonal variations, and not be just a matter of drenching to suit certain calendar months. Drenching must also be combined with spelling of paddocks and changing of feeding grounds. Noticing the results on some properties in this district, where worm troubles persist in spite of regular and frequent drenching, it makes me wonder if overstocking of paddocks or even properties may be the reason for the survival of the worm.

It seems to me that good management requires a flexible approach towards problems. This needs to take into consideration current seasonal assets of pasture and water firstly, and a frequent review on a wide scale of what might be necessary in regard to the land and the stock some months ahead. I feel that this is a surer approach than to wait until problems have become acute before attempting to deal with them.—Your affectionately, Dad.

Fruit Fly Control in Deciduous Orchards

By A. W. S. MAY, Senior Entomologist.

All deciduous fruits, particularly stone and pome, are susceptible to fruit fly attack. Even almond and walnut crops are prone to damage by these pests. Grapes and figs may be damaged when ripening coincides with above-average rainfall.

During early settlement, stone and pome fruits were grown throughout areas in south eastern Queensland climatically suitable to these crops. Fruit fly is responsible to an appreciable extent for the present distribution: the intense production of these fruits is now confined to the cooler Stanthorpe district on the southern highlands, and only early maturing varieties are grown commercially in coastal and subcoastal areas.

Despite this crop distribution some further attention to fruit fly control is still necessary to maintain profitable production.

SPECIES OF IMPORTANCE.

The *Queensland fruit fly* is responsible for most of the damage to deciduous fruits. *Jarvis's fruit fly* attacks stone and pome fruits in coastal, subcoastal and southern highland districts between mid-summer and mid-autumn. At times, it may assume some importance though it is never the dominant species. *Perkins's fruit fly* also attacks stone and pome fruits in coastal and subcoastal areas but always as an incidental pest in association with the *Queensland fruit fly*.

SYMPTOMS OF DAMAGE.

Fruit fly stings in immature stone fruits usually show as small darkened spots in the skin. These may become more conspicuous as the fruits ripen. With plums and nectarines, however, the area surrounding each sting becomes sunken and necrotic. The eggs from these early infestations often fail to hatch, or hatching may be delayed until the fruit approaches maturity. Some of the stung fruits may wither and fall, or be shed following larval development as they ripen. All fruits stung when in the soft stage decompose rapidly as the larvae develop.

When immature apples are stung, depressions form in the vicinity of each sting as the fruit ripens. During periods of major fruit fly activity, numerous stings may be made in individual fruit which later become grossly misshapen and pitted. When cut, such fruit exhibits numerous thin brown streaks in the tissues. These correspond with the random tunnelling of the newly hatched larvae and are sometimes mistaken for symptoms of boron deficiency. As a rule, only a few of these larvae develop to maturity.

Stings in grapes appear as black, irregular-shaped spots in the ripening skin. Fine, threadlike, black lines radiating from these are the tunnellings of the newly-emerged larvae. These larvae seldom develop to maturity though secondary organisms invariably promote fruit decomposition.

Only figs allowed to ripen on the tree or those that split may be attacked.

Eggs are never laid through the skin, but are placed directly into the orifice of the ripe fruit. Larval development is generally suppressed by secondary organisms.

The influence of these factors varies with districts. In coastal and sub-coastal areas, early-maturing stone fruits may be stung as early as late September. In highland districts, egg laying in early season varieties can be expected no earlier than mid-October, and will depend on the occurrence of good rains in this period. Hot, dry conditions during October and November, however, will suppress stinging until fruits ripen or may prevent damage entirely. In inland areas, particularly far-western, major damage to early crops of deciduous fruits is unusual, and is experienced only during seasons of exceptional spring and early summer rains. Normally, fruit fly is not active until after mid and late summer storms.

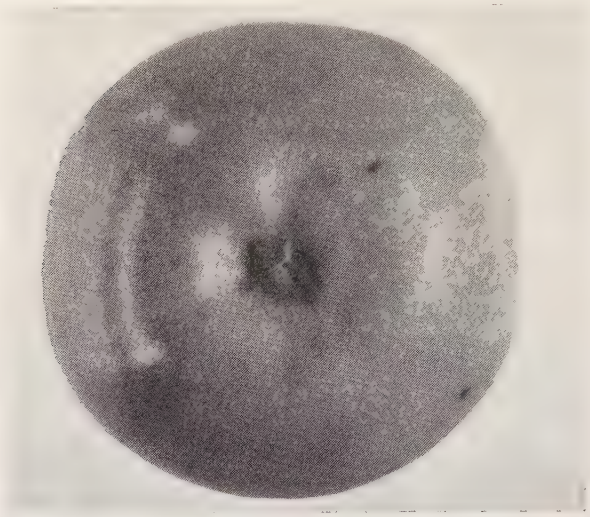


Plate 1.

Queensland Fruit Fly Stings in Granny Smith Apple.

Damage in walnuts is quite unlike that in other deciduous fruits. Stings show as black spots and tissues blacken and become papery as larval tunnelling proceeds. The nuts fall prematurely.

FACTORS INFLUENCING DAMAGE.

Seasonal Conditions.

Rainfall and high humidity when fruits are ripening are important factors influencing fruit fly activity and consequently the amount of damage. In years of normal rainfall, two periods of major fruit fly activity can be expected. The first occurs during the early summer storms, between early October to early December, and the second coincides with the advent of the wet season, from late January to late March. In abnormally wet summers, however, fruit fly will be active throughout the summer months.

Varieties.

The growing of suitable varieties is basic to the lessening of fruit fly losses in deciduous orchards. With most crops this is due to the selected varieties ripening at times when the pests are not usually active in the districts concerned. With grapes, however, the American varieties, particularly the Isabella, are actually more susceptible than the European varieties.

CONTROL.

Harvesting.

Harvesting as a means of avoiding fruit fly damage is of practical importance only for apples and figs. Figs particularly should be harvested as soon as mature, and as quickly as possible when splitting occurs following rain.

Chemical.

Success of fruit fly control depends on the prevention of egg laying by the flies during fruit development, and this is best achieved by applying a DDT spray programme timed to coincide with periods of fruit fly activity.

Lure traps hung well in advance of the harvest date, in trees carrying susceptible crops, will provide definite information on the need for preventive spraying. These traps should be serviced regularly while fruit crops are maturing.

DDT, at 0.2 per cent. spray concentration, is applied at the first indication of fruit fly activity. It is put on as a partial cover spray so as to wet as much of the foliage and fruit as possible without undue runoff.

Approximately 1½ gallons of spray are required to treat large, well-foliaged trees.

Further DDT spraying may be necessary should trapping results indicate continued fruit fly activity. In seasons of intense fruit fly activity, two sprayings, two weeks apart—the first about four weeks before harvest—are usually sufficient to prevent damage in southern highland districts. In coastal areas, more frequent applications will be required, the initial treatment being applied after the first storm rains in early October.

In apple and pear orchards, DDT cover sprays applied in January for codling moth control, also prevent losses from fruit fly in early-maturing varieties in a normal season. In exceptionally wet summers, however, early varieties may be stung during late December, prior to the mid-summer codling moth cover spray applications. The possibilities of damage, once codling moth cover sprays have ceased, to mid and late season varieties in February and March should not be overlooked. Catches in suitably placed traps will

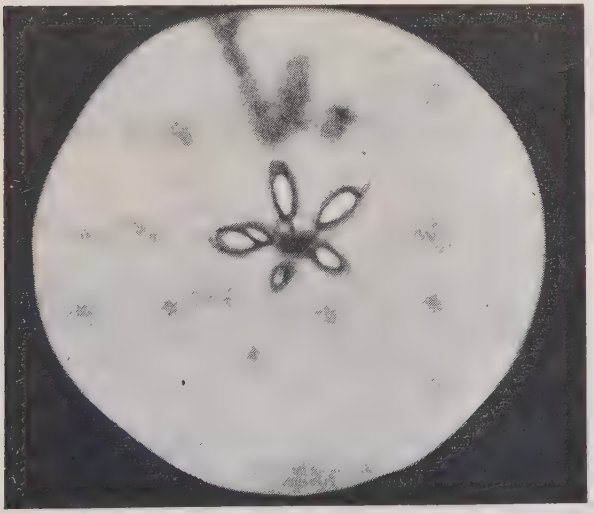


Plate 2.
Early Stages of Fruit Fly Tunnelling in an Apple.

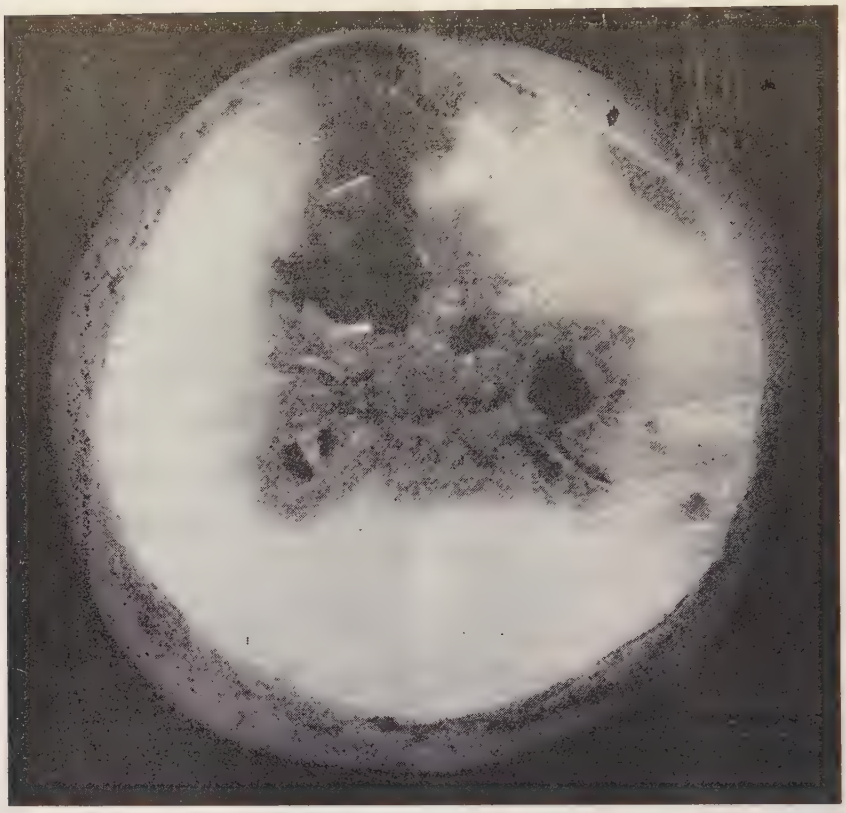


Plate 3.

Advanced Fruit Fly Damage in a Pear.

indicate any renewed fruit fly activity, and the necessity for additional DDT treatment.

One general application of DDT spray to the vines is usually sufficient to protect a grape crop.

Spraying figs to lessen fruit fly damage is seldom of value (*see* Harvesting).

Walnuts and almonds, though of little economic importance in Queensland, may be protected by DDT sprays as for stone fruits.

As the use of DDT for fruit fly control may increase the activity of mites, attention to these pests should be given as required.

SCIENTIFIC NAMES.

Queensland fruit fly	..	*Strumeta tryoni* (Frogg.)
Jarvis's fruit fly	..	*Afrodacus jarvisi* (Tryon)
Perkins's fruit fly	..	*Strumeta humeralis* (Perk.)

These Growers Market Bananas in Winter

By L. J. MISSINGHAM, Adviser in Horticulture.

A number of fruit growers in North Queensland market substantial quantities of bananas during the winter and spring months when prices are reasonably good.

This is not a matter of luck; rather, it is the reward of good plantation management. Under normal conditions, the grower aims to harvest the bulk of his crop between June and October for consignment to southern markets. To do this, he must be familiar with the behaviour of the banana plant in a tropical environment. Otherwise he would have considerable difficulty in controlling the time of bunching and the time of harvesting.

TIME OF PLANTING.

The production of a plant crop between June and October presents no serious problem as the fruit is usually cut some 12 to 14 months from the time of planting. If the rainfall is well distributed, planting in August or early September will give the desired result. However, should hot, dry weather occur in spring after planting, and this is not uncommon, the plants make little growth until late

Plate 1.

Bananas On Alluvial Soil. With the aid of irrigation and efficient management, plantations of this kind harvest the bulk of the crop in winter and spring without difficulty.

in the year and bunching is delayed, so much so that a large proportion of the bunches are cut in the summer months when prices are falling to marginal levels.

Planting in June and July might seem preferable to planting in August and September; but the initial growth is slow, and the bunches produced are relatively small. In practice, therefore, it is better to plant in late April or May. Plantings made during this period are invariably well established before the onset of winter and are able to withstand dry weather should this occur in spring and early summer. Such conditions are, if anything, an advantage for they tend to delay the plant crop so that it matures after the wet season when it can be handled without difficulty.

If a plantation established in the late April-May period encounters good growing weather during the whole of the following nine months, some of the plant crop bunches will be ready for cutting at the end of the wet season. At that time of the year, the fruit may not carry well and the market returns are usually low. There are, however, some compensations. If sucker-setting on the forward plants is properly timed, the first ratoon bunches may be cut about six months after those cut from the parent plants, that is, in early spring when good returns can be expected. In addition, the second ratoon bunches developing from followers set on the first ratoon plants would be harvested 12 months later—again in spring.

It is, of course, unusual to experience consistently good growing conditions over the nine-month period from planting. Nevertheless, a production programme in which the plant and the first ratoon crops are harvested between April and November in the same year and the second ratoon crop during winter and spring of the following year is practicable where irrigation facilities are available. It can be most remunerative.

Under dry farming conditions, plant growth is very largely controlled by the season, and accurate timing of the ratoon crop poses special problems.

If the suckers which first appear in a rain-grown crop established between late-April and May are retained, the first ratoon bunches will normally mature their fruit between December and March when price levels are relatively low. On the other hand, if the plants are regularly desuckered to permit the setting of followers in the autumn, the parent plant may have "spent" itself and any suckers which are then available will be weak, shallow, and unsuitable types for the ratoon crop.

KEEP THE FIRST SUCKER.

One method of overcoming this difficulty is to retain the first sucker produced by the parent plant until it is large enough to produce suckers of its own from which the required follower for the first ratoon crop can be selected at the correct time. The "nurse" sucker is then cut back when it is about half grown to encourage the development of the selected follower.

Assuming an April-May planting, the "nurse" sucker is selected about December and all other suckers on the parent plant are eliminated. Were they allowed to remain, they would inevitably slow down bunch development on the parent plant and have an adverse affect on bunch size. In late-April or May of the following year, the "nurse" sucker will be producing suckers of its own or alternatively be large enough to do so. At this stage, it is cut at ground level and the centre gouged out right down to the solid corm. The growing point must be destroyed.

The "true" follower is selected on the butt of the "nurse" sucker and all other suckers are suppressed.

Such followers provide the first ratoon crop. The harvesting time for the ratoon crop can be estimated fairly accurately by his method, particularly if only one follower is retained at each stool.

On the more fertile soils, two followers can be set at each stool. If this is done, it should be remembered that bunch development in both the plant and ratoon crops will be delayed, bunch size may also be reduced;

Plate 2.

Sucker Development in the Banana. Setting the right sucker at the right time is the key to crop control in the plantation. Suckers set in late April and May provide a ratoon crop in winter and spring.

the two followers compete with each other for moisture and plant foods in the soil. Under these conditions harvesting in both the plant and ratoon crop therefore extends over a longer period than in plantations where the single follower system is practised.

INCIDENTAL PROBLEMS.

Few commercial plantations are uniform from stool to stool; age of planting material, soil variabilty and other factors tend to introduce differences in the plantation. For example, there are always a number of backward plants in an April-May planting from which suckers set in the normal way (just before the parent plant throws its bunch) will produce the ratoon bunch only a little ahead of winter. On such backward plants, it is usually sound policy to set two suckers rather than one; the competition between them will delay bunch maturity for a month or two and the fruit will be cut in winter when it is wanted.

Setting three or more suckers for the ratoon crop would, of course, delay bunch development still further. This practice may appear to be an alternative to setting a "nurse" sucker. It is, however, impracticable in rain-grown plantations, as the plants quickly show symptoms of stress in hot, dry weather. Further, defoliation from leaf spot is much more serious and the quality of the fruit is adversely affected; angular, prematurely-ripened fruit is often an aftermath of such over-crowding.

The foregoing method of increasing winter and spring production in North Queensland banana plantations has proved itself in commercial practice. It meets the essential needs of the growers; the crop is harvested at the most convenient time of the year, and the fruit is sold on profitable markets. Returns for the expenditure on labour and materials which is involved in producing the crop are at their peak.

Dairy Parade

"Willow Bank Pansy," a Jersey cow owned by Mrs. I. L. M. Borchert, Kingaroy, has qualified for entry into the Elite Merit Register. To enter the Elite Merit Register, a cow must produce a minimum of 3,600 lb. of butterfat in not more than 10 lactations.

In six production-recorded lactations, Pansy has given 67,837 lb. (30 tons) of milk and 4,123 lb. (1.8 tons) of butterfat. The average fat content of the milk was 6.1 per cent.

Pansy is the seventh cow in Queensland to qualify for this distinction. She is the second Jersey cow to enter the Elite Merit Register and holds the Queensland production records for Junior four-year-old and mature cows of that breed.

As a Junior four-year-old, this cow produced 11,640 lb. of milk containing 794 lb. of butterfat, and as a mature cow 14,574 lb. of milk and 922 lb. of butterfat. These amounts were produced in lactation periods of 300 days.

In 1955 for a 360 days' lactation, Pansy produced 16,500 lb. of milk containing 1,027 lb. of butterfat. This yield made her the first officially recorded Jersey, and the second cow of any breed in Queensland to produce over 1,000 lb. of butterfat in one lactation.—*S. E. PEGG, Chief Adviser, Herd Recording.*

Store Bean Seed The Right Way

By E. L. HASTIE, Adviser in Horticulture.

If good bean seed is kept dry, cool and free from insect pests and vermin, it will germinate well. Many poor crops of beans are due to the use of seed which has deteriorated in storage.

Wrapped up inside each hard, shiny seed-coat of the bean seed, there is a living plant. The germ, or embryo, of the plant is enclosed between two large, fleshy cotyledons or seed leaves. These contain a reserve of food materials for the young seedling until its own root system is established and also protect the young embryo from mechanical injury. The seed-coats prevent it from drying out.

The seed is a living organism, and life processes such as respiration are going on in it during storage but only at a very low rate. Warmth and moisture tend to speed up these processes. Consequently, when a seed is planted in warm, moist soil, growth begins almost immediately. Within a few days, the seedling bursts through the seed coat and pushes its way up to the surface of the soil.

Plate 1.

Bean Crop Grown Under Irrigation. Good germination of the seed is the basis of high yields in the crop. Badly stored seed is a common source of partial crop failures.

If seed becomes slightly damp in storage, especially if it is kept in a warm place, it soon loses its viability. Under cool, dry storage conditions, however, the embryo plant deteriorates so slowly that the seed stays alive for many years. If properly handled, stocks of bean seed can be held about three years and there is no trouble in keeping them from one season to the next.

Moisture—The Enemy of Stored Seed.

Under moist conditions, bean seed deteriorates fairly rapidly. In coastal areas, where the atmospheric humidity is high during the wet summer months, special precautions are needed to keep the seed viable from one season to the next.

Quite apart from its effect on viability, moisture encourages the growth of surface moulds and other fungi which rot the seed. Once decay of this sort starts in a batch of seed, it is difficult to prevent it going through the whole lot. The remedy is to keep out moisture from stored seed.

Drying the Seed.

Before putting the seed into store, make sure that the bin is thoroughly clean and, above all, quite dry. The same applies to the seed itself.

If by any chance the seed happens to have got damp, or is suspected of being damp, it should be spread out in a 2-3 in. layer on the floor of a well-ventilated room for three or four days before it is put into storage. The seed may also be dried in the open, under shade; direct exposure to the sun may lead to irregular drying in the batch and possibly over-drying. In the latter case, the seed becomes very brittle and may be injured if handled roughly. Such injury is a common cause of "bald heads" in a recently germinated crop.

Good bean seed is sometimes scarce, and many growers save their own seed. When harvesting beans for seed, the pods should be left on the plant until they have dried out. The seed will then have reached the right stage of maturity and will be dry enough for threshing. If the pods are not quite dry, they are difficult to thresh and the soft seed is very liable to injury. Further, if moist or immature seed is put into an airtight bin, it will "sweat" and raise humidity of the air in the bin to levels which encourage the development of moulds.

Keep the Seed Cool.

Storage temperatures affect the keeping quality of bean seed. The lower the temperature, the slower the rate at which the life processes go on in the seed, and the longer it will remain viable. Seed can be kept for very long periods under refrigerated conditions. It is obviously desirable, therefore, that the seed should be kept in the coolest place available on the farm.

Frequent changes in temperature during the storage period are especially harmful to bean seed. If the seed is exposed to big variations in temperature, it deteriorates more quickly than if kept at a uniformly low temperature.

Methods of Storage.

Many types of container are used on the farm for storing bean seed. Probably the most common method of holding seed grown on the farm is to put it in clean sugar bags and stow them somewhere in a corner of a shed. Unless the seed is thoroughly dried before it is bagged and the shed itself is well ventilated, such seed can be held only for a limited period without deterioration.

Sometimes insufficiently dried seed is kept under poor storage conditions during the summer months before it is planted in autumn. Summer happens to be a wet period of the year on the North Coast where the bulk of our winter green beans are grown. Is it any wonder, then, that germination in the field is sometimes bad when home-grown seed has been harvested in damp weather, insufficiently dried, and then held for several months on the farm?

An old milk can makes an excellent bin for storing small lots of bean seed. A 44-gallon drum is equally suitable provided it is fitted with a good, tight-fitting lid. A small galvanised iron tank makes a good bin for larger quantities of seed; with bins of this kind, the seed can be left in the bags and several distinct lines of seed can be held in the one bin. Seed must be thoroughly dry before it is placed in an air-tight container. Seed which is apparently dry may still contain more than the maximum amount of moisture (14 per cent.) that is permissible under these conditions.

Plate 2.

Bean Plants Two Weeks After Germination. If your young crop shows gaps in the row, your seed may be at fault. A germination test will check the position.

Protect Seed from Insects and Vermin.

Insects and other vermin can quickly destroy a batch of seed should they gain access to it. If the seed is stored in metal bins provided with tight-fitting lids, vermin such as rats and mice are automatically excluded. This will not, however, prevent the seed from becoming damaged by the bean weevil and other insects.

An old method of controlling such pests was to seal down the bins with a lighted candle inside in order to convert the oxygen in the atmosphere of the bin to carbon dioxide which is lethal to insects.

Other and more convenient methods are commonly used. The most popular of these is to dust the seed before storage with an insecticide such as BHC (1 per cent. gamma isomer) dust at the rate of 3 oz. per bushel. The dust is easy to apply. Treatment is necessary for all home-grown seed which is to be stored and will also be needed for commercial lines of seed which have not been so treated by distributors before sale—unless, of course, the seed is to be planted shortly after delivery on the farm.

Keep only Sound Seed.

The bean crop can only be as good as the seed which is planted in the field. Therefore, make sure that you use only the best seed available.

Bought seed should be well graded when it is purchased. Home-grown seed, however, will need to be picked over after it is threshed to remove small, wrinkled or damaged seed. The culls usually will not germinate and if they do, will produce weak and stunted plants.

Stock Gazette

AN estimate of the number of worms your sheep are carrying is often a useful guide in planning control measures. A burden of 1,000 barber's pole worms, 10,000 hair worms or 100 to 200 nodule worms is likely to cause severe symptoms or death. Although a post mortem examination may show that worms are present, it does not tell how serious the infestation is. But a worm count will, and a simple, yet reasonably accurate, worm count can be done at the same time as the post mortem. You should always make a worm count if you're in doubt about the severity of an infestation in your flock.—*R. B. YOUNG, Senior Adviser in Sheep and Wool.*

A phosphorus-rich supplement fed to cattle in the winter and spring will correct any phosphorus deficiency caused by low quality pasture at this time of the year. You can supply extra phosphorus by giving cattle sterilized bonemeal licks or by adding phosphate to the drinking water. Licks can be used everywhere, but they are relatively wasteful and not all cattle will take them. A suitable lick can be made up from bonemeal and salt. Where cows are fed in bails, bonemeal can be fed by giving each cow 2 oz., with an additional ounce for each gallon of milk she produces. Phosphate for addition to the drinking water can be obtained by soaking 5 lb. of superphosphate in a gallon of water for 24 hours and using the clear fluid on top. One gallon is sufficient to treat 100 gallons of water. Automatic dispensers are available for adding the concentrate to the trough.—*K. HALE, Veterinary Officer.*

Potted Facts—

Peanut Growing In Queensland

By D. R. LEWIS, Division of Marketing.

This is the first of a series of short articles by officers of the Division of Marketing, giving some salient features of various primary industries in Queensland.

PEANUTS, or ground-nuts as they are otherwise known, are the main world source of edible vegetable oil, being widely grown in tropical and subtropical regions. The nuts are not only crushed for oil but are also directly consumed. The residue after crushing is an excellent fodder, and, in the United Kingdom, scientific research has produced a synthetic fibre with properties somewhat similar to wool.

By world standards peanut production in Australia is very small, but, as has been pointed out elsewhere, peanuts are an important crop in the Australian economy as an import saver.

According to the Commonwealth Economic Committee's publication "Vegetable Oils and Oilseeds" the world peanut harvest in 1955-56, excluding China, was estimated at 9 million tons, of which India alone produced 3·8 million, Nigeria 756,000 tons and French West Africa over 900,000 tons. Our northern neighbour, Indonesia, produced about 300,000 tons. Our largest crop, in 1947, produced 23,000 tons.

The first season in which peanuts were grown to any extent for commercial purposes in Australia was 1924, and the crop was practically all grown in Queensland, the State now considered most suitable for peanut production.

The Peanut Marketing Board was created in 1924; four years later, in 1928, was formed The Queensland Peanut Growers' Co-operative Association Limited. At the same time growers levied themselves at the rate of ¼d. per lb. of peanuts in order to provide storage and treating machinery. The levy was first deducted by the Board from the final payment on the 1927 crop and handed over by the Board to the Association. A similar system of collection and disposal of the levy continues today.

Until 1930, Queensland growers had been growing the Spanish variety of peanuts almost exclusively but the Board undertook to supply also Virginia Bunch for the roasting trade. Today the Virginia Bunch variety provides the larger part of the peanut crop. In the 1957 season this variety accounted for 66 per cent. of the Board's intake.

Peanut growing is largely concentrated in the South Burnett, of which Kingaroy is the centre. Dominating the whole town, whether the traveller arrives by air or by road, is the imposing storage and treatment plant of the Co-operative.

Appreciable quantities of peanuts are also produced in the Rockhampton district and on the Atherton Tableland.

Plate 1.

Peanut Threshing is a Job for All Hands.

Production is far short of Australian requirements and considerable quantities are imported, either in nut form or as oil. In 1956-57 we imported 1,070,599 gal. of oil, valued at £825,530, and 660 tons of peanuts valued at £98,000.

Most of the peanuts find their way to southern States, where the main manufacturing firms are to be found. The larger part of the crop is used either in the raw form, or roasted and salted, or in various forms of confectionery and in peanut paste. A big part of the harvest is crushed for oil.

Table 1 shows the receivals by the Board over the past 11 years.

TABLE 1.

PEANUTS: RECEIVALS BY THE PEANUT MARKETING BOARD.
(*Tons*).

Season.	Kingaroy.	Atherton.	Rock-hampton.	Total.
1957	6,872	1,354	451	8,677
1956	7,023	998	871	8,892
1955	11,767	1,463	1,819	15,049
1954	15,727	3,081	2,098	20,906
1953	5,813	2,427	857	9,097
1952	2,250	1,569	360	4,179
1951	4,287	700	250	5,237
1950	7,449	811	409	8,669
1949	9,852	819	407	11,078
1948	13,757	1,160	965	15,882
1947	21,878	528	794	23,200

(Source: The Peanut Marketing Board).

TABLE 2.
RETURNS TO GROWERS—*1947–1957*.
PENCE PER LB.

Season.	1st Advance (*a*).	Total.
1957	6·375	(*b*)
1956	5·25	11·226
1955	5·25	8·06
1954	6·25	9·18
1953	6·25	11·20
1952	6·00	10·71
1951	3·75	9·875
1950	3·25	5·86
1949	2·75	5·52
1948	2·75	3·93
1947	2·75	4·21

(Source : The Peanut Marketing Board).
(*a*) Including levy. (*b*) Not yet finalised.

Returns to growers since the 1945 season have been as shown in Table 2.

There is still a long way to go before we grow sufficient peanuts to meet our domestic needs. There is also a market waiting to be tapped in New Zealand.

Weather conditions have not been very favourable in the past two or three years, but growers are still confident, as demonstrated by the increased acreage sown to the crop this year.

Farm Wisdom

NOT many people can look at a standing forage crop and estimate its yield accurately. Yet sometimes you need to know the yield, especially when you're filling a silo. To find out the yield of a row crop planted 3 ft. apart, cut and weigh the forage from two yards of row. The weight in pounds will give you the number of tons to the acre. If the distance between the rows is 2 ft. 6 in., then weigh the material from 2½ yd. of row. When the row spacing is 3 ft. 6 in., weigh the material from 1¾ yd. of row. For sward crops like cowpeas, cereals and pasture, the sampling area is 2 sq. yd.—*J. E. RAWSON, Agronomist.*

THE provision of a satisfactory soil conservation service to farmers is often hampered by a marked fluctuation in the demand for these services. It is better to have a smooth, continuous service throughout the year than a rush demand for contouring for a few months only. During the rush period after crops are harvested neither soil conservation officers nor contractors can do justice to the work. The solution lies in forward planning based on consultation with your soil conservation officer. He knows the general district demand and can suggest alterations in cropping programmes which will enable you to contour your paddocks on a systematic basis.—*J. E. LADEWIG, Chief Soil Conservationist.*

ROOT-KNOT nematodes are present in all tobacco-growing soils in Queensland. These tiny worms enter the growing roots and cause damage. Many infested seedlings die, while older plants give low yields of poor quality, papery leaf. Farmers can protect their plants by sterilizing the seedbed before sowing and fumigating the soil in the field before transplanting. The best method of sterilizing seedbeds is by burning the organic material from the centre of white ant hills on the site about two days before sowing. Brushwood may be used as a substitute if antbed isn't available. In the field, the soil should be fumigated with either EDB or DD soil fumigants at least three weeks before transplanting. The soil should be free from weeds, in good tilth and reasonably moist.—*G. W. SAUNDERS, Entomologist.*

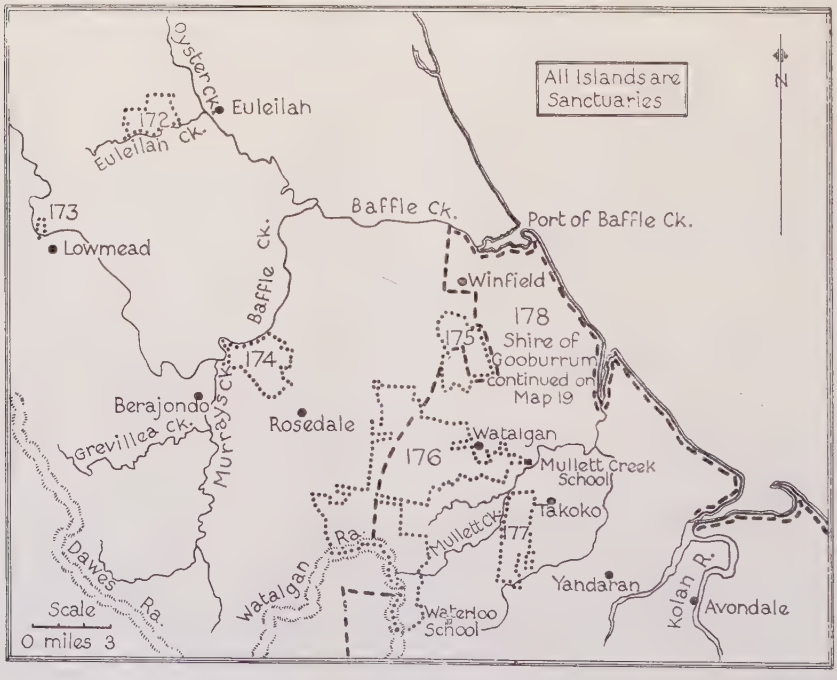
Queensland Fauna Sanctuaries

By C. ROFF, Fauna Officer.

(Continued from July, 1958.)

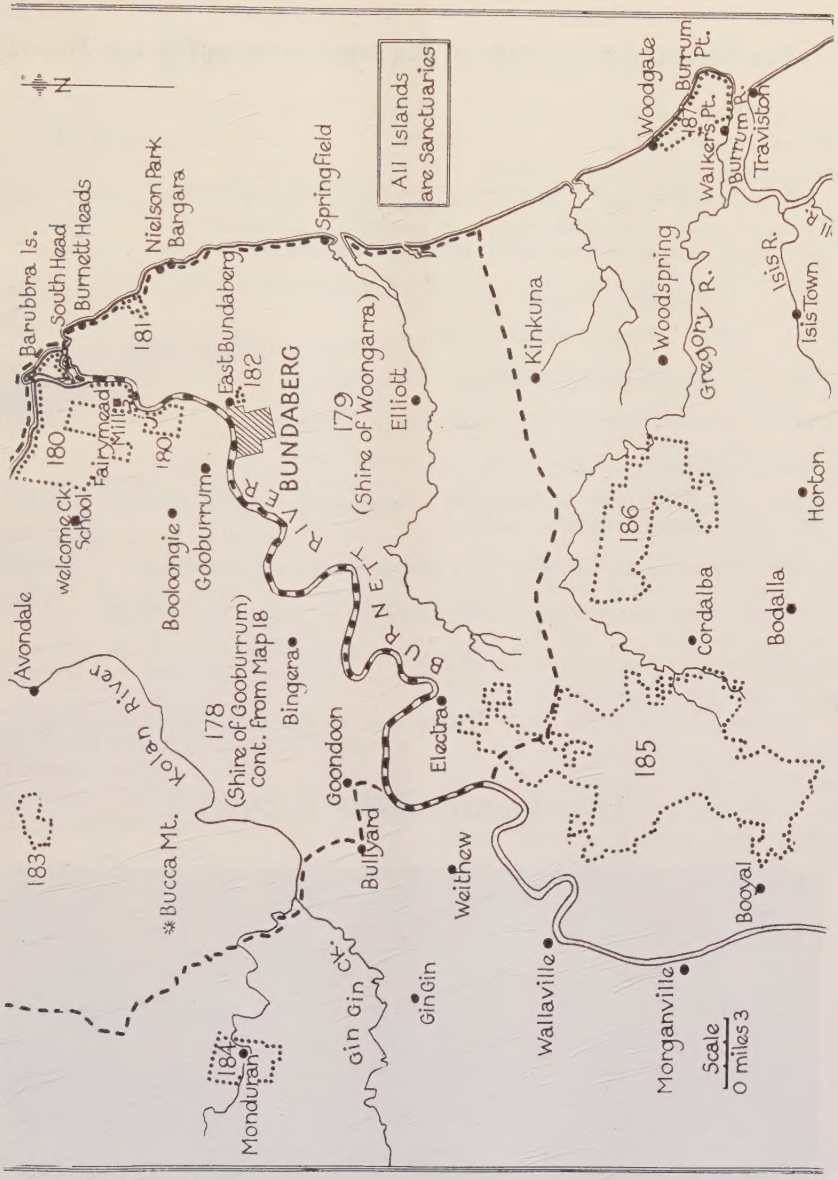
The following is an index of the sanctuaries outlined in Map. 18.

Index No.	Sanctuary.	Area in Acres.
172	Property of E. F. Colyer, Lowmead	1,708
173	Baffle Creek Camping and Water Reserve, Lowmead ..	90
174	Rosedale Station, Rosedale	2,738
175	State Forest Reserves 175, 188, Parish of Tottenham, via Watalgan	3,180
176	State Forest Reserves 78, 80, 103, 198, Parish of Littabella and Tottenham, via Watalgan	17,224
177	State Forest Reserve 49, Parish of Littabella, via Yandaran	2,560
178	In Map 18 the boundaries of the Shire of Gooburrum as at 29–1–1916, are delineated by a broken line. The roads, reserves and unalienated lands within this Shire comprise a sanctuary on their own, in addition to the other sanctuaries indicated. (Balance in Map 19).	



Map 18.

Map Showing Sanctuaries in Part of Fauna Districts Nos. 1 and 2. The sanctuary boundaries (as at December 31st, 1957) are delineated by dotted lines (except as otherwise provided for Sanctuary No. 178).



Map 19.

Map Showing Sanctuaries in Part of Fauna District No. 1. The sanctuary boundaries (as at December 31st, 1957) are delineated by dotted lines (except as otherwise provided for Sanctuary No. 179).

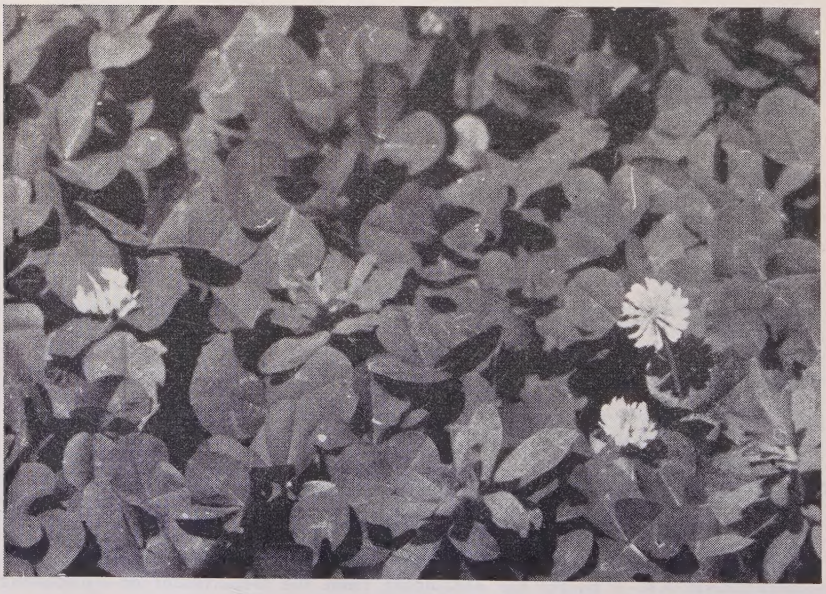
Australian Tractor Test.

Copies of the Australian Tractor Testing Committee's report on the International AW-7 Diesel are obtainable from the Department of Agriculture and Stock, Brisbane.

The following is an index of the sanctuaries outlined in Map. 19.

Index No.	Sanctuary.	Area in Acres.
179	In Map 19 the boundaries of the Shire of Woongarra as at 30–1–1932, are delineated by a broken line. The roads and reserves within this Shire comprise a sanctuary on their own in addition to the other sanctuaries indicated.	
180	Fairymead and adjacent lands, via Bundaberg	9,334
181	"Mon Repos," via Bundaberg	297
182	Water Reserve, Bundaberg	130
183	State Forest Reserve 723, Parish of Yandaran, via Avondale	1,037
184	Monduran, Kolan River, via Gin Gin	2,820
185	State Forest Reserve 832, Parishes of Gregory, Stanton and Electra, via Cordalba	40,680
186	State Forest Reserve 779, Parish of Gregory, via Cordalba ..	11,650
187	State Forest Reserve 278, Parish of Hercules, via Walkers Point	4,180

This Picture Tells a Story



Good Soil and Good Feed Stem from Legumes such as this Irrigated Clover.

To Harvest Lucerne Seed

"G.M.", of Boonah, has inquired about harvesting lucerne seed.

Answer: Very few lucerne crops are harvested for seed in Queensland, the practice being confined generally to the older lucerne-producing areas of New South Wales.

The production of lucerne seed is at times a risky venture. Experience helps in judging the most suitable conditions. It is the practice to allow one crop to go to seed when the conditions appear favourable. Generally a somewhat thin well-established stand is to be preferred to a thick, vigorous hay stand though a three-year-old stand can be used. The cut which would produce hay in January or February is generally selected for seed production.

The crop is allowed to go to seed and is cut when the pods have turned a deep yellow. This colour is important, as the buyers do not like dark coloured seed. If the crop is not ripening evenly it is best to cut when the maximum amount of prime seed can be expected.

Mowing is carried out in the early morning during dry weather. The swathboard may be left on the mower and the crop left in the swath for one or more days, depending on weather conditions. At the end of this period the swath is gathered into heaps with pitch forks and left for a day or two before being carted in for threshing. Another method is to remove the swathboard from the mower, mow the crop and gather it into heaps the same day or the following day and then cart it in for threshing on the third day. Careful handling of the crop is essential.

Threshing is usually done from the stack and an all-crop harvester is a suitable machine for this job. It is also possible to use an all-crop harvester to pick the crop up from the swath and thresh the seed in the field—thus saving some handling.

It is the usual practice to store the seed in airtight tanks or drums, or in double sacks stored in a dry place where the seed may mature prior to marketing. Keep the seed perfectly dry.

—*Agriculture Branch.*

Summer and Winter Grasses.

"J.M.", of North Ipswich, seeks information on suitable summer and winter grasses for his district.

Answer: There are a number of summer grasses which would be suitable for growing in the North Ipswich district. Of these the most suitable would be—Rhodes grass, green panic, paspalum, and Kikuyu grass.

Of these grasses the first two are more suited to the ridges and the paspalum to the flats. Kikuyu grass requires a higher fertility level such as that of scrub soils. It is worth while including such legumes as lucerne and phasey bean in the grass mixture.

If the soil fertility is suspected of being low the application of fertilizer should be considered as part of pasture management.

The winter grasses need irrigation in order to keep pasture production at a high level. In south-east Queensland, increasing prominence is being given to irrigated winter pastures, and where irrigation is possible, one of the following mixtures should prove satisfactory: (1) Irrigation white clover 2 lb., Hl rye grass 4 lb., *Phalaris tuberosa* 2 lb., *Phalaris arundinacea* 2 lb., Paspalum 4 lb.; or (2) Irrigation white clover 2 lb., Hl rye grass 4 lb., Paspalum 8 lb.

—*Agriculture Branch.*

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